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ALL KNOWN SPECIES OF *Broughtonia*

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Orchids

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Lasca Leaves

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ORCHIDS

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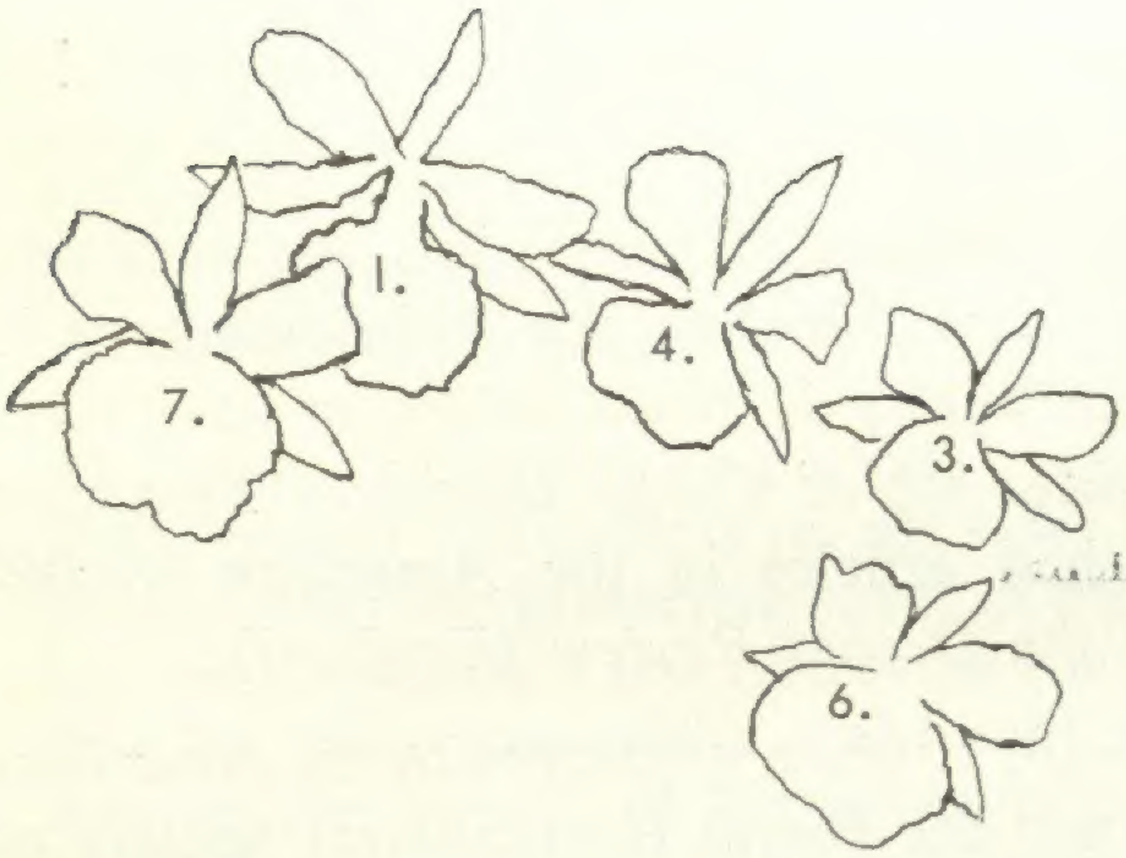
Orchids

ON THE COVER

The cover of our "orchid" edition, which commemorates the Fifth World Orchid Congress at Long Beach, illustrates all of the known species of the genus *Broughtonia*. This is the first time these little-known natives of Jamaica have been shown in a single color plate. Broughtonias deserve to be grown more commonly, as they are of easy culture, thriving in full sun and a warm, humid environment. Cover Photograph by Dr. J. A. Fowlie.



1. *Broughtonia negrilensis*
2. *Broughtonia domingensis*
3. *Broughtonia sanguinea*
4. *Broughtonia sanguinea* var. *flava* "Carmen Gauntlett"
5. *Broughtonia sanguinea* var. *alba*
6. *B.sanguinea* x *B.negrilensis*
7. *B.negrilensis* x *B.sanguinea*

IN THIS ISSUE.

This single subject issue, devoted entirely to orchids, reviews the recent advances made by collectors and hybridists in Southern California and contains an up-to-date listing of all of the species in the Arboretum collection.

DR. J. A. FOWLIE, who writes of his experiences collecting Broughtonias, is a graduate of Wayne University. He has published over 100 papers on orchids and is on the Editorial Board of Orchid Digest.

ERNEST HETHERINGTON, general manager and vice president of Stewarts' Orchids, served his apprenticeship under B. O. Bracey at Armacost and Royston. After service in the South Pacific with the Air Force in World War II he has developed the breeding program at Stewarts in Cymbidiums and Cattleyas and recently the miniatures which are sold throughout the world to amateur and commercial growers.

LEO HOLGUIN is the present manager of the orchid department at Armacost and Royston. He came to Los Angeles thirty years ago from Silver City, New Mexico, to study electronics and became side-tracked. After a stint in the Air Force in World War II, he returned to Armacost where he went up the ladder to his present position.

EMMA D. MENNIGER, who with her husband, Elmore, has the commercial establishment Greenoaks in Arcadia, is well-known for hybridizing early flowering and miniature cymbidiums. Their hobby is book-collecting and their large horticultural library contains a complete set of *Curtis Botanical Magazine* and other priceless books. She has published articles in the *American Orchid Society Bulletin,* the *Cymbidium News* and the *Orchid Review* (England).

The orchid conference and show April 14-19, 1966, is sponsored by the American Orchid Society and its 170 affiliated units and the Royal Horticultural Society of England. Local host is the Orchid Society of Southern California. Headquarters of this international event is the Lafayette Hotel and the show, which runs April 14 to 17, is at the Long Beach Arena.

The Editor

The Enigmatic Broughtonias of Jamaica

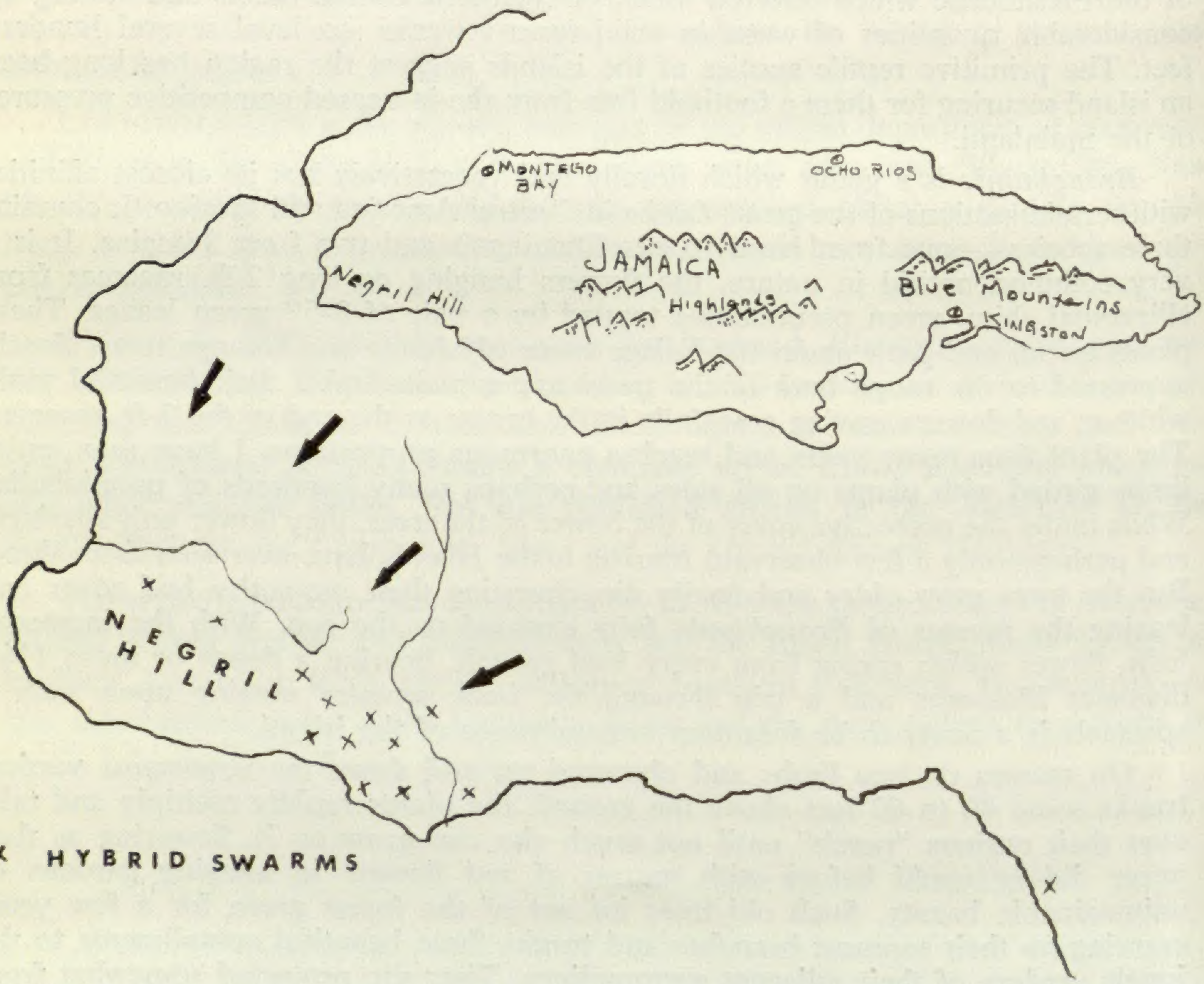
By J. A. Fowlie

The island of Jamaica was not always an island and maps of the floor of the Caribbean Sea show a great, narrow land mass extended eastwardly from what is now Nicaragua and Honduras and terminated against another mass now represented by Cuba, Haiti (Santo Domingo) and Puerto Rico. How long this land bridge lay above the sea is difficult to ascertain, but the recurrent instances of orchids with their closest relationships with Central American genera, now wholly endemic to Jamaica, are numerous. The last connection might have been during the glaciations of the Pleistocene which covered much of Northern United States and storing up considerable quantities of water in solid form lowered sea level several hundred feet. The primitive reptile species of the islands suggest the region has long been an island securing for them a foothold free from the increased competitive pressures of the mainland.

Broughtonia is a genus which florally and vegetatively has its closest affinities with certain sections of the genus *Laelia* in Central America and Mexico. It contains three species — one from Haiti (Santo Domingo) and two from Jamaica. It is a very common orchid in nature, the flowers hanging on long 2-ft. racemes from ellipsoidal shiny green pseudobulbs topped by a pair of 3-5″ green leaves. These plants sprout and grow under the foliage cover of Mango and Guanga trees, closely appressed to the rough bark of the trees' upper main limbs, their beautiful pink, white or red flowers waving gracefully in the breeze at the end of the 2-ft. racemes. The plant lives many years and reaches enormous proportions. I have seen entire limbs girded with plants on all sides and perhaps many hundreds of pseudobulbs. While under the protective cover of the bower of the trees, they flower only sparingly and perhaps only a few observant tourists to the Islands have ever seen them there. But the trees grow older and finally die, dropping their protective leaf cover and leaving the masses of *Broughtonia* fully exposed to the sun. With the increased light, flower spikes spring from every lead growth, bearing a dozen or more 1½″ diameter blossoms and a trip through the back country coming upon such a spectacle is a never to be forgotten remembrance of the island.

On masses on tree limbs and clustered up and down the uppermost vertical trunks some 40 to 60 feet above the ground, the plants rapidly multiply and take over their curious "perch" until not much else can grow on it, flowering as they never did or could before with masses of red flowers in hanging gardens of unimaginable beauty. Such old trees jut out of the forest green for a few years carrying on their topmost branches and trunks these beautiful compliments to the jungle verdure of their adjacent surroundings. They are protected somewhat from molestation by natives since the dead, rotting trunks are rather hazardous and awkward to climb, yet the simplest of the country people guide you to these trees and point upwards with some nationalist pride at the beauty before you.

Time, however, moves against them and what seems an eternal mass of beauty is victimized by its weakest link — the tree on which it grows, for as the rot of the trunk progresses, the masses of *Broughtonia* grow even heavier with their roots tightly attached to the upper bark layers. Finally, large chunks of bark come loose from the main trunk and the plants attached to them come crashing to the shroud of grasses and scrub growth at the foot of the tree where, finding life no longer bearable, the *Broughtonia* plants quickly perish. Chunk by chunk the bark masses fall away, carrying with them to inevitable destruction their clusters of orchids until finally a bare, smooth rotting trunk stands in the countryside devoid of any bark covering or epiphytes. The tourist who years before had come upon unimaginable beauty returns on his next visit to the island to find the spot only to see it occupied by a smooth old tree stump which in time also crashes to the ground. The irony of the cycle is not dismay, however, for in surrounding trees if one looks closely are the seedlings produced during the short span of such extreme floriferousness which one day will grow to great masses and repeat the cycle.



Hort-Pix

Orchidarium in Montego Bay, Jamaica, built with contributions.

There are two species on the island. *Broughtonia sanguinea* (Swartz) R. Brown and *Broughtonia negrilensis* Fowlie. The first species exhibits a very wide range occurring all around the perimeter of the island within 6 miles of the seacoast and up to 600 ft. elevation. The altitude record of it as established by Dr. Pengelley is about 1600 ft. at Shooter's Hill in one of the southern protected valleys. It is not found in the interior of the island.

Broughtonia negrilensis occurs only on the extreme WSW tip of the island on a 10-mile long ridge known as Negril Hill which rises to a mere 500 ft. at its summit. There appear to be no *Broughtonia sanguinea* plants except east and north of this ridge where hybridization occurs freely and numerous wild hybrids of the two are encountered (see map, page 4).

Broughtonia sanguinea has reddish lavender flowers and is extremely polymorphic. The species as collected around the perimeter of the island vary in intensity of coloration and flatness of the flower (to tubular flowers), arranged helter skelter with what superficially appears to be no plan in mind. This is not the case, however, since there is a floral ecotype which occurs up the dryer valleys of the south coast to some 6 miles inland which has very tubular flowers. This may be an adaptation to preserve the pollen of such flowers from the dessication of these regions of lower humidity and higher evaporation rates, since the flowers of the coastal or more humid areas are usually flat (opened fully). The tubular flowers

obviously are the more pristine condition. Removed from such environs, subsequent flowerings in the same greenhouse continue to maintain the flat and the tubular flowers respectively, suggesting it is an inborn genetic trait. Probably, the ability to form tubular flowers or flat flowers is carried in the gene pool of the species and in hotter, drier regions seedlings of plants are differentially favored which will bear tubular flowers; whereas in moister regions seedlings which will have the open flower form are favored. This would explain the frequent appearance of the ecotype with tubular flowers up distant ravines with no communication in between, the genotypes in the seed stages carrying the potential to develop into tubular ecotypes or flat ecotypes and on germinating favoring the appropriate ecotype in the appropriate environment differentially over the other form.

Hort-Pix

Dr. F. Levy, inside the public orchid house, is a prominent collector of orchids in Western Jamaica.

Broughtonia negrilensis, on the other hand, appears to have only a tubular flowered ecotype, enhancing its survival in the drier ridges of Negril where it is endemic. It lives very similarly to *B. sanguinea* with the same ovoid-ellipsoidal pseudobulbs but vegetatively has one striking difference from the latter species; namely, the leaves are covered with a thin coat of resiny powder which insures their reflection of excess light and decreases evaporation loss of vital moisture from the plant. This powdery coat and the lighter green foliage are so characteristic of the species it may be recognized even out of flower from *B. sanguinea* with which it otherwise is very similar. Natural hybrids between the two are intermediate both in amount of powder and color of leaves and pseudobulbs.

At this point it should be mentioned that *B. domingensis* (Lindley) Rolfe from extreme southwestern Haiti (Santo Domingo) also resembles *B. negrilensis* and was once confused with it. This latter species, however, has subcylindric not ellipsoidal pseudobulbs and differently colored flowers which lack a nectary. The vagaries in the taxonomy of the group have been reviewed by this author in *Orchid Digest* pp. 109-114 for March, 1965, and I will not dwell on them further. There has arisen a contention, however, that must immediately be dispelled, that the plant from Negril hill represents a natural hybrid between *B. domingensis* and *B. sanguinea.* Nothing could be farther from reality. In point against this idea is the almost complete absence in either *B. domingensis* or *B. sanguinea* of this powdery material which reaches such an extreme degree in the Negril population. Further, the subcylindric pseudobulb of *B. domingensis* never appears in back-crossed or out-crossed materials in Negril, nor does the deficient nectary spur so

characteristic of the latter species of Haiti. Finally, natural populations of *B. negrilensis* frequently have cleistogamous forms (self fertilizing) which are not present in natural hybrids but the sole effect of degeneration in an archaic population long deprived or deficient of its specific pollinator!

In November of 1959 I had an opportunity to visit the gardens of Noel Gauntlett in Kingston, whose uncle around the turn of the century had discovered the alba color form of *B. negrilensis*. Led to the habitat of this form in the labyrinth of gullies which characterize the Negril Region, Mr. Gauntlett's uncle was helped by a small negro native girl who knew the location. Years later he returned to find more plants since his own had perished only to find the little girl had shortly thereafter taken mysteriously ill and died and the superstitious natives would have nothing to do with helping him refind the locale. The experiences of the younger Gauntlett were no less fantastic, however, when one day while riding a bus on the Northcoast road he caught a glimpse of a dead Guanga tree out in the middle of a sugar cane field near Coleraine, Annotto Bay. Almost asleep his eye fell on delightful, yellow flowers waving atop two-foot spikes in the breeze, far across the field. Just at that moment the sight disappeared from view as the bus rounded a corner, and after a frantic few moments getting to civilization he was able to alight, obtain a car, and drive back to the spot. There, atop the tree, his eyes fell on the only six plants in existence of *Broughtonia sanguinea* var. *flava* 'Carmen Gauntlett.' He was kind enough to furnish me with plants of this unique find for the Arboretum collections.

Hort-Pix

Miniature orchid in the Arboretum collection.

The story of Eric Tomlinson was no less exciting. A year or two later while collecting along the south coast of the island in the vicinity of Portland Ridge he noted the *Broughtonia sanguinea* species of the region had progressively faded out to a very light pink. Whether by hunch or by insight a return to the region on several occasions during the flowering period caused him to come across *B. sanguinea* var. *alba* near Portland Point lighthouse. This is also known from a mere six plants. There, nestled in a shallow gully, the alba form had developed.

We now know that all these color phases are the product of protracted in-breeding, where a limited number of individuals find themselves trapped far out from the dilution their breeding would experience if they lived with the overwhelming normal masses. Thus, pollination of necessity is effected by pollen grains from a very limited number of individuals so that effective self-crossing, back-crossing and out-crossing is carried on for centuries. One of the first things lost

by the resultant prominence of the mutant genes of such phenotypes is the higher color pigments, anthocyanin and anthoxanthin, resulting in yellow or flavistic color varieties. This is probably due to elimination of the delicate oxidation-reduction mechanisms (genetically) so important for flower color or the pigment precursor's manufacture (genetically). Other similar localities of *alba* and *flava* forms are reported but have not been substantiated to my knowledge.

With Dr. Pengelley and his charming wife I had an opportunity to investigate and collect the ridges of the Negril district and the swamps northwest of the Savannah La Mar just to the NE of Negril. Prevailing tradewinds from the Northeast bring insects bearing pollen on their backs from the *B. sanguinea* districts and waft them into the midst of the *B. negrilensis* populations on the northeastern slopes of Negril Hill. Here, insects visiting flowers, accidentally place pollen on mother plants of *B. negrilensis*. The plants are quite abundant in certain pockets and it is possible to visit areas where vegetatively and florally the colonies are perhaps 90% almost pure *B. negrilensis* and 10% natural hybrids. The hybrids from such regions, since segregation has apparently not yet occurred in the F_2 generation have a fairly uniform appearance no matter which pocket is entered, so long as the predominant plant is *B. negrilensis*. Conversely, north and eastwardly one finds areas where there are backcrosses, outcrosses, and occasionally pure *B. sanguinea* plants. East of this zone are one or two pockets of about 90% *B. sanguinea* and 10% hybrids which again reach some constancy in appearance. These surely are natural hybrids whose maternal parent was *B. sanguinea* just as those of the converse location on Negril hill represented natural hybrids whose maternal parent was *B. negrilensis*. As one approaches the top of Negril Ridge the hybrids disappear and one gets into pure stands of *B. negrilensis*. It is difficult to fathom what force prevents the overrunning completely of the *B. negrilensis* populations of the ridge from pollen from the *B. sanguinea* and hybrid populations below to the Northeast!

From the above it is apparent the group must have occurred from Jamaica to Cuba and Haiti (but not Puerto Rico) as a single species, living on a narrow peninsular strait from its migration in prior millenia from the region which is now Honduras and Nicaragua. Elevation of sea level (or depression of the land mass) disjunctured the region into the greater antillean islands we know today, Cuba, Haiti and Jamaica. Subsequent to the disjuncture for a time considerable sea existed between what is now Negril hill and the rest of Jamaica which freed isolated colonies there of the primordial inhabitant and allowed it to retain certain vestigial features (tubular flowers), separated from the usurpation of its habitat of the species which subsequently evolved on Jamaica proper *(B. sanguinea)*. Subsequent millenia, long after the two had evolved into separate species, has created a shallow swamp, where once a shallow strait existed and allowed migration of colonies of *B. sanguinea* southwestwardly onto the Negril Ridge, driven behind the pressure of prevailing northeasterly trade winds. Presently, there is some form of "balance" in existence between the two populations since the Negril populations have not yet been over-run. Thus we can conjecture the sequence of events which have occurred in these peculiar enigmatic *Broughtonia* species!

Miniature Cattleyas

By Ernest Hetherington

Since cattleyas were introduced to the greenhouses of England and Europe over a century ago, they have been the favorites of orchid growers almost everywhere. In fact, their popularity lead is increasing because of their almost unbelievable variety—both in colors and types. The astronomical number of possible combinations from a deck of playing cards is literally small compared to the vast number of combinations which can be made in the cattleya hybrid group.

Stewart's Orchids

A dwarf orange and red primary hybrid, S.L. Psyche is derived from *Sophroitis grandiflora*

In most orchid literature, the term "cattleya" is a comprehensive name given to all hybrids of the cattleya intergenic hybrid complex. Fortunately, there are many related genera of great diversity in color and type which can be intercrossed and the possibilities are limited only by the resourcefulness and imagination of those who work with this section of the orchid family. While many breeders work for a full range of types, some of the most knowledgeable hybridizing is in studying certain types and specific influences.

Categorizing the major sections in the cattleya complex, we find first the conventional purples which most people think of when the word "orchid" is mentioned. While still the most popular type of cattleya, these must share the limelight with the beautiful whites which come in great variety and types. The companions of the white cattleyas are the semi-albas—the whites with purple lips. Currently among the most popular of all cattleyas are the yellows and allied shades, and the so-called reds. This type stems primarily from the dwarf Brazilian species *Sophronitis grandiflora*. Other types of cattleyas for which the public has minor interest are the blues, greens, bronzes and other novelties.

A type which has been little explored but which has increased greatly in popularity in recent years, is the miniature cattleya. Here there is a whole realm of jewel-like, diminutive hybrids of infinite variety still to be created. The possibilities are limitless because a great many of the species of cattleyas, laelias, brassavolas and allied genera are what might be called of miniature growth and flower habit. Let us not concern ourselves so much with tiny flowers as with restrained growth that has the floriferousness and colorful blooms of good size on a small plant.

The reasons for raising miniature cattleyas are the same as for raising miniatures in non-orchidaceous plants: lack of growing space and a natural liking for smaller plants. Because orchid growing has increased tremendously in popularity in the past two decades, there are many people who wish to grow orchids but do not have the space. Their only facilities may be a window sill, a small glass Wardian case, a bay window, solarium or other similar small area. Miniature orchids fit right into this scheme.

The goals of the hybridizer of miniatures are:

1. Growth habit be scaled down to approximately a hand span in height, and compact.
2. Plants should be easy to grow and flower.
3. Flowers should be colorful and well-carried in heads or in sprays.

In other words, miniature cattleyas must have a number of desirable qualities rather than just be small. The basic principle in breeding this type is to use species which have a dwarf or miniature growth habit and which exert this influence, both in the primary hybrids and beyond.

Let us now explore a few of the major species and see how they have been used. In the genus *cattleya,* one of the most valuable species is *C. luteola* which has a compact growth habit with a total plant height of from six to eight inches and which bears 6 to 10 heads of one- to one and a half-inch, light yellow flowers. Some of its recent worthy hybrids are Slc. Chatter (× Slc. Lindores 'Queen of Hearts; A.M./AOS), Blc. Papoose (× Blc. Clayton Chong), C. Baby Kay (× C. bicolor), and the very attractive Lc. Burnt Orange (× Lc. Pacific Sun). Two other important Cattleya species are *aclandiae* with its unusual green and purple spotted flowers; and the green or mustard yellow-flowered *forbesii.*

One of the most important *Laelias* is the bright yellow *L. flava.* We must place the orange to red *L. milleri* next to *L. flava,* for it appears to be identical in most respects except for the coloring. This is a new species just being used for breeding, with outstanding promise. The orange *L. harpophylla* and *L. cinnabarina* must be included here, too.

As with any of the species I shall mention, the progeny can go either direction in size, according to how the dwarf parents are used. Although best known as the progenitor of many of our magnificent round purple cattleyas, *L. pumila,* with its many varietal forms, is extremely dwarf in its own habit. *Sophronitis grandiflora,* no higher than a cigarette, is a major influence in miniature breeding. Other dwarf species are the broughtonias, dwarf epidendrums, several of the brassavolas, such as *B. nodosa, B. glauca,* and that ubiquitous species of that genus, *B. digbyana.*

Over 23,000 orchid hybrids have been registered since the first hybrid was made by Dominy in the last century. The vast majority of these were created, raised, and then passed into oblivion. In fact, there was little, if any, reason for their existence. One of the rules of orchid nomenclature is that all seedlings from a given seed pod, and in a combination which has not been made before, are given a new name. For instance, A × B = C, A × C = D, ad infinitum. All of these hybrids are registered in that invaluable series of orchid books, *Sander's List of Orchid Hybrids.* In doing research on hybridizing of any sort, it is necessary to refer to this excellent guide. No mystery story enthusiast can follow a more interesting trail than the orchidist in picking up blood lines of a particular line

Stewart's Orchids

A miniature cattleya. *Lowiara* Trinket derived from *SC. Psyche* x *Brassavola digbyana.*

Stewart's Orchids

Miniature species. *Cattleya quinquecolor.*

of breeding—often through seven and eight generations. So it is in studying our miniature breeding.

One of the most interesting of these is *Sophrolaelia* Psyche. This very dwarf orange to tomato red primary hybrid from *Sophronitis grandiflora* × *Laelia cinnabarina,* cross has thin bulbs and leaves, with an overall height of 5″-8″. When crossed with *Brassavola digbyana,* the charming *Lowiara* Trinket was created. Trinkets are basically replicas of conventional Brassos, but about ¼ size. These come in yellow, orange, salmon, and coral. Trinket crossed with the orange *C. aurantiaca* makes the very new, brightly colored miniature *Potinara* Cherub which is notable for its richness of coloring in oranges and yellows. Psyche by Henrietta Japhet makes *Slc.* Mischief; by *Brassavola nodosa* makes *Lowiara* Lila; by *Slc.* Sunburst makes *Slc.* Diablito.

One of the most charming of the miniature hybrids is *Sophrolaelia Marriottiana* (*Sophronitis grandiflora* × *Laelia flava*). Most of these crosses have bright yellow or orange flowers with very distinctive miniature growth habit. Their season of bloom is throughout the winter months. Some of the other hybrids from this species are Lc. Gold Star, Lc. Questava, Lc. Flirtie, and Lc. Flavina.

To be successful, any orchid plant or hybrid must be of easy culture. An introduction which requires special care loses most of its value, for the average grower is not going to give each plant special treatment. Most miniature cattleyas require the same culture as conventionals. Practically all cattleya hybrids, regardless of type, require what is known as intermediate conditions. These are a minimum night temperature of about 60° with the temperature rising in the daytime according to the time of day and year to the 70's and 80's. The most satisfactory and most universally used potting medium is the standard fir bark-redwood bark mix of about 2/3 fir bark and about 1/3 ground redwood bark. Feeding with most any well balanced orchid plant food, such as Stewart's Ideal at the rate of 1 teaspoon to a gallon of water for ten days or two weeks, will give good results. One of the most important rules of Cattleya culture is to make sure that your plants are well dried out before watering. Upon watering, soak them thoroughly. Because a number of the hybrids are primaries, thorough drying out between waterings is of special benefit.

While some enthusiasts may go all out for miniatures, miniatures find their widest acceptance with the average orchid grower who may be looking for plants which have colorful blooms but which have more restrained growth habits, or he may simply like them because they are tiny. Whether the plant be diminutive Epicat Lollipop with its puffs of tiny pink flowers, or the jewel-like orange and yellow Potinara Cherub, or the lovely yellow Bc. Daffodil, miniatures have much to commend them. You do not have to be an orchid grower to try a few orchids. If you do wish to raise some orchids, why not start in a small way? Get a few miniatures. The only danger is that you might become addicted to orchids and spend the rest of your life having a love affair with this captivating family of plants.

The Development of Semi-albas

(White Colored Lip)

By Leo Holguin

While there have been many improvements in our present-day cattleya hybrids, little has been done to improve the semi-albas until just recently. It may be that the cut flower trade has had little demand for this type of flower, consequently commercial growers have had less incentive to improve its quality. Basic, of course, has been a shortage of good parent stock with which to work.

In this article, no attempt will be made to trace the development of semi-albas strains from the species beginning to the present, but will mention some of the better hybrids that have appeared. You will note much line breeding has been done in an effort to develop future breeders.

The species on which the foundation was laid are:

Cattleya mossiae (Reineckiana)
Cattleya dowiana aurea
L. purpurata alba
C. warscewiczii (Gigas) "Fran Melanie Beyrodt"
C labiata alba
C. trianae alba

Of these, *L. purpurata alba* gives a good, solid lavender lip, but a poor form. *C. mossiae* "Reineckiana" imparts the *mossiae* type lip with fairly good form. From the Gigas comes a solid lavender lip, along with good form and substance; however, the keeping qualities tend to be poor.

C. dowiana aurea, one of the much-used species in almost all lines of cattleya hybridizing, imparts a good lip color. To the semi-albas, it imparts poor form and light cream sepals and petals. However, form seems to be easier to breed out than in *L. purpurata alba. C. labiata alba* has not been used much, possibly because of poor lip color. *C. trianae* seems to have been used very little, even though most offspring have good form. Possibly the lip may be weak.

In recent years, some hybridizers have attempted to improve the semi-albas with good results. This has been done by finding some good, worthwhile tetraploids and diploids. There are appearing on the market today some very good semi-albas, and I believe we will continue to see improvements along this line.

One of the crosses most repeated is *C. enid alba (C. mossiae "Reineckiana"* × *C. gigas).* Here the *mossiae* type lip dominated and form was excellent. There were a few strains with a little darker lip but not solid color. Out of some of these *C. enid alba* strains some tetraploids appeared which proved very valuable for future breeding. One other worthwhile cross which was consistently good, but difficult to obtain seed from, was *LC. Snowdrift (C. Cynthia* × *C. Annetto). LC. Cynthia* "Model" was used with very good results.

Another good cross was *LC. Jay Markel (LC. Cynthia* × *C. May Markel).* Other crosses were (*C. enid* × *C. gigas*), *C. loranore* (*Elenor* × *C. lorna*), *LC. aconcagua (LC. schroderae alba* × *C. Maggie Raphael).* The F.C.C. variety *of LC. aconcagua* produced good hybrids. There are, of course, a number of others with fair form. With the exception of a few, the crosses were not consistently good, however.

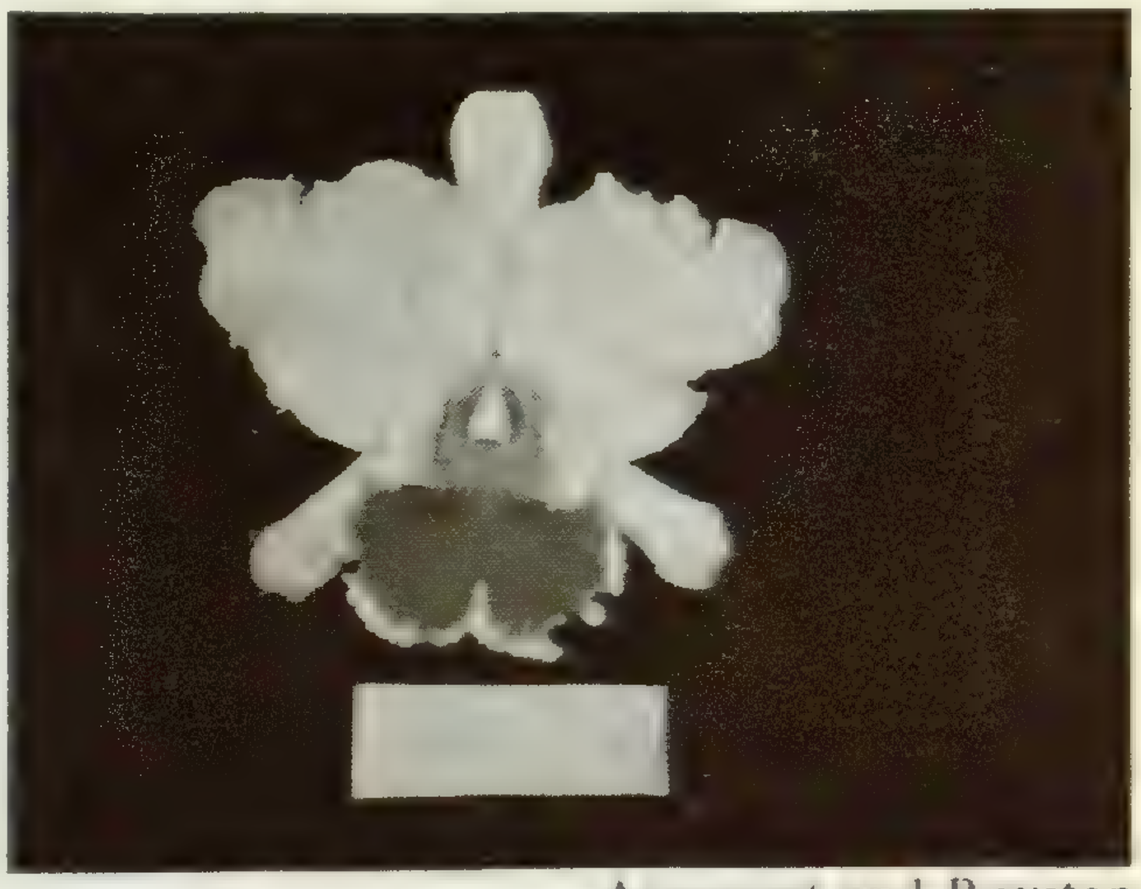
It is interesting to note that most semi-albas with solid lavender lips have *C. dowiana aurea, L. purpurata alba* and *LC. schroderae* in the background. The dark, solid-colored lip of *L. purpurata* has come through in each generation, while the *Laelia* form has been a drawback. In some cases, selective breeding has improvide shape in each successive generation.

Alberts and Merkel Bros. are having good results in their semi-alba program. We should see some very good hybrids in the near future. They have some fine hybrids of (C. Loranore × LC. Bembridge alba), LC. endridge (LC. Bembridge × *C. enid alba*), and C. Loranore (C. Eleanor × C. Lorna). In 1960, Beville registered a cross of LC. mem. Maggie Hood (*LC. aconcagua* × *C. enid alba*). I believe Alberts and Merkel repeated this cross using *LC. aconcagua* F.C.C. × a tetraploid *C. enid alba*. This has been very outstanding. For example, *LC.* mem. Maggie Hood, Pride, A.M. A.O.S.; *LC.* mem. Maggie Hood, Brilliant, A.M. A.O.S.; *LC.* mem. Maggie Hood, Boynton, A.M. A.O.S.; and a number of other good Maggie Hoods have been produced. Best of all, I understand they are all tetraploids and are being used for future semi-albas. Most all of the L.C. mem. Maggie Hoods I have seen have brilliant lavender lips—truly a beautiful flower.

John Lines of Oliver Lines Orchids is also having success in semi-albas. One of his favorite breeders is LC. Peggi Mayne Lines (L.C. Eugene × C. May Markel). Some of his semi-albas are LC. Winter Snow (LC. Peggi Mayne × LC. Snowdrift), LC. Josephine Robinson (LC. Cynthia × LC. Peggi Mayne Lines), LC. Stephen Oliver Fouraker, Lines A.M. A.O.S. (one of his best), and LC. Stephen Oliver Fouraker Beauty (LC. Peggi Mayne Lines × *C. enid alba*). I understand this is an outstanding cross.

Many more awarded and award quality flowers are C. Bess Truman (*C. clotho alba* × *C. ardmore alba*), LC. Helen Powell (*LC. schroderae* × *LC.* Peggi Mayne Lines). This has a very brilliant lavender lip — in fact, all these crosses have outstanding lip color.

At Armacost and Royston, we have had some luck in finding some good breeders. One lucky find was C. Kittywake, Brilliance, A.M. O.D.C. (*C. brussels* × *C. luegeae.*) Some Kittywakes have solid lip color but most have semi-solid, but not as mottled as the usual mossiae type. The clone called Brilliance has a solid purple lip with a thin white edge. Form is good and all desirable qualities appear to be passed on to the progeny. Lip color seems to be dominant, as well as the form. C. Nevada (*LC.* peter the great × *C. enid alba*) which has poor form,



Armacost and Royston

C. Kittywake "Brilliance"

Hort-Pix

Miniature Orchids in the Arboretum Collection.

somewhat like *L. purpurata,* but a bright lavender lip, was used with C. Kittywake, Brilliance, to produce C. Nevawake—good forms and solid, bright lavender lips. C. Kittywake backcrossed to C. Brussels produced C. Lindo Mar. These also have good form and solid lip color. C. Kittywake crossed onto C. Huron produced C. Margaret Link, which is probably the best of these crosses. All are uniformly good with brilliant lips. This cross was remade to prove a point, using C. Kittywake, Brunette. This does not have a solid lavender lip but is similar to a good *C. enid alba.* Some of this progeny is flowering now and few have solid lip color, and the form is fair. C. Jean Haddon is another C. Kittywake, Brunette, cross. Good form from *C. alwynii* but few solid lips.

You can see from this that it will not be long before you will see the Bow Bells type of flowers in the semi-albas. Some are that way now. It is just a matter of time.

This article has been written about the crosses with which I am most familiar and it has not been my intention to slight anyone, or any cross. I know there must be other crosses equally as good, or better, and other hybridizers having good results in other parts of the country. I would appreciate hearing about them for future articles or lectures, and credit will be given to the proper parties.

Hort-Pix

Miniature Orchids in the Arboretum Collection.

There's Magic in Miniatures

By Emma D. Menninger

YES, there is MAGIC in miniature roses, miniature daffodils, miniature gladiolus and now miniature Cymbidium orchids. Miniature Cymbidiums are enchanting apart from the beauty of their larger, well-loved relatives — for their charm, their ease of culture and the economy of space they demand, since these plants are usually much smaller than most of the large-flowered types. Like the standard Cymbidiums, they have long-lasting flowers, for a month or more, but added to this, many of the miniature hybrids are more floriferous than the larger types. While the standard hybrids have a fairly restricted season of bloom for each hybrid, miniature hybrids flower over a longer period, some flowering from late summer through late spring. Indeed, at times, we have had miniature Fairy Wands in flower in every month of the year. Miniature hybrids, also, sometimes have a succession of flower racemes that may keep them in flower for months. The wealth of bloom, however, is in the early fall until spring.

Greenoaks

Mimi *"Sandalwood"*

DWARF SPECIES

In order to understand how miniature Cymbidiums came about, a few dwarf species that have been crossed with larger-flowered Cymbidiums can be mentioned:

The species that has contributed to the majority of miniature hybrids is the Chinese dwarf *Cymbidium pumilum*. The plant has a neat habit of growth with leaves less than 12 inches in length and with many-flowered racemes. The blooms of *pumilum* are only about one inch across, the commonest variety having reddish-brown flowers with white lips heavily dotted with red. Another variety of *pumilum* more recently hybridized is the so-called *album* variety with light green flowers that are used with large-flowered greens to give green-flowered miniatures. Varieties of *Cymbidium pumilum* have been prized and selected by Japanese growers for hundreds of years, among which varieties are different clones with variegated leaves. The brown varieties when hybridized with larger flowers have produced brown, rose, pink, green, yellow and even white flowers, all much smaller than might be expected.

A delightful fragrant dwarf species, the green or yellow *ensifolium*, flowers in late summer. When crossed with larger Cymbidiums, usually greens, the progeny tend to inherit the upright raceme and fragrance of the dwarf parent and its summer and fall season of flowering.

The dark flowered species *devonianum* usually contributes its darker colors of green and brown and its pendant raceme to its progeny. The unusual leaves of *devonianum* are about 1½ inches wide with a petiole, both scarce in the Cymbidium genus. Other species of Cymbidiums that have produced miniature hybrids are *madidum*, a fairly large plant with small apple-green flowers on pendulous racemes and *hoosai* with tall spikes of starry flowers.

Greenoaks

Cymbidium pumilum

Many other species, including the coriaceous-leaved types and other rarer ones, offer possibilities for unusual miniature hybrids.

ORCHID NAMES

It should be mentioned here that the naming of orchid hybrids is quite different from that of most other plants. All hybrids derived from the same cross are given the same collective name, so there may be hundreds of hybrids in a variety of colors with the same collective name. However, each may be distinguished by a

varietal or cultivar name or epithet. For example the collective name of Fairy Wand 'Mignon', is Fairy Wand and the cultivar epithet is 'Mignon'. There are other cultivars of Fairy Wand with different varietal names.

Greenoaks

Miniature *Cymbidium* Fairy Wand "Katy B"

PRIMARY HYBRIDS

The trend began when a lovely miniature hybrid Minuet with dusky rose flowers won an Award of Merit from the Royal Horticultural Society in England in 1942. This was a *pumilum* cross with the Cymbidium species *insigne*. Minuet immediately caught the fancy of orchid growers because of its delightful small flowers, otherwise almost replicas of the larger types. Thereafter, a few other *pumilum* miniatures were registered in England, but soon the scene shifted to Southern California, famous for its fine standard Cymbidiums. A number of Southern California pioneers started hybridizing for miniatures with the dwarf *pumilum*, crossing it with the larger flowers. Several of these miniatures were registered in the middle 1950's. The first of these were from Mr. Arno Bowers who registered Sweetheart (*pumilum* × Alexanderi) and Polka (*pumilum* × Madeleine) both charming hybrids in a variety of colors. Then came two hybrids from Fred A. Stewart Orchids, Flirtation (Zebra × *pumilum*) and Bo-Peep (*pumilum* × Purpureum) these also in a variety of colors. Greenoaks followed with the pink and rose to wine Fairy Wand (*pumilum* × Princesse Maria) and Dos Pueblos with the green Peter Pan (*ensifolium* × Miretta).

Besides the above-mentioned *pumilum* hybrids of which there are many more than can be mentioned here, there are others, such as the *ensifolium*, *madidum* and *hoosai* hybrids.

The *ensifolium* hybrids which flower in the late summer and fall come in tones of yellow and green. They are usually very fragrant. Like the parent *ensifolium* they have erect racemes above the foliage. The hybrids of *ensifolium* are in short supply. They include Korintji (*ensifolium* × Rangoon) made by Stewart's Orchids and our Kim (*ensifolium* × Pearl 'Mastiff') as well as the previously mentioned Peter Pan (*ensifolium* × Miretta). Another interesting development was the recent flowering of Mrs. Mary Bea Ireland's crosses using the Australian species *madidum*. The plant are fairly large, but not as large as the *madidum* parent, with many diminutive flowers in green tones on delightful arching racemes. Mitiz (*madidum* × Angela) and Fifi (*madidum* × Argonaut) are two of Mrs. Ireland's crosses. Our cross Cricket (*devonianum* × *madidum*) is a primary cross that favored its *devonianum* parent except for smaller brown flowers on a pendent raceme. A few *hoosai* crosses which usually produce dark star-like flowers on tall racemes have been registered.

SECONDARY HYBRIDS

The late Arno Bowers made a number of crosses with selected clones of Sweetheart. From these crosses Paul and Marion Miller, who now own most of Bowers' stock of miniatures, received a number of awards for some lovely so-called "second generation" miniatures. These were distinguished by flowers of good form with the upright raceme derived from the Sweetheart parent. The fertility of these second generation hybrids, especially Showgirl (Sweetheart× Alexanderi) appears to be very low, probably because some were the progeny of the tetraploid Alexanderi 'Westonbirt' and so thought to be sterile triploids. Some of the Showgirls were the progeny of the diploid Alexanderi Hamilton-Smith and thus could be fertile.

Greenoaks
Miniature *Cymbidium Minuet*

The small flowered *devonianum* hybrid Jean Brummitt has produced a number of second generation hybrids. It appears that there is a sterility barrier to much further breeding in the *pumilum* hybrids not present in the more advanced *devonianum* hybrids. However, a number of clones of *pumilum* crosses have given fertile seed such as some Fairy Wands, Flirtations, Pathfinders, Mimi 'Sandalwood,' a clone of Showgirl and the aforementioned Sweetheart.

POLYMINS

The hybrids hitherto mentioned have been derived presumably from diploid crosses, except where the tetraploid Alexanderi 'Westonbirt' was used. In the early 1960's Dr. Lee Lenz registered two crosses of which the large-flowered parents were tetraploids, namely Babylon 'Castle Hill' and Balkis. These were Oriental Legend (*pumilum* × Babylon 'Castle Hill') and Evening Star (*pumilum* × Balkis). In both cases the tetraploid parents gave somewhat larger plants with beautiful flowers. The Oriental Legends in rose and cinnamon tones received no less than six awards at one meeting of the Cymbidium Society. I have called these crosses of a dwarf species with a large-flowered tetraploid parent, *polymins*. Later Mrs. Lillian Reed offered her flowering *pumilum* plant for my use since I wished to make the polymin cross with the tetraploid Pauwelsii "Comte de Hemptinne'. A few of these have flowered. The cross was given the name of Pinafore, of which one cultivar 'Comet' shown at last spring's San Diego show, had two spikes about five feet tall with a total of 75 reddish-brown miniature flowers.

JUDGING MINIATURES

The Cymbidium Society has two special judging forms for miniature Cymbidium plants. One is for plants that "must be miniature in all categories; size of leaves, bulbs and flowers. Cut spikes not judged." The other form is for Novelty Cymbidium plants. These are usually larger than those judged by the first form and the "Plant must have dwarf flowered species in the background, cut spikes not judged." The flowers should not be over 2½ inches across. The awards consist of Bronze Certificates and Silver and Gold Medals. The book "Cymbidium Hybrids and Awards", published recently by the Cymbidium Society, stars all the miniatures and lists their awards through part of 1965.

RECENT AWARDS—1965

A few of the Cymbidium Society awards with the exhibitor's name are:

King Arthur 'Magic Wand', Fred A. Stewart Orchids
Mary Pinchess 'Copper Glow', P. L. Porter
Mimi 'Sandalwood', Menninger—Greenoaks
Nella 'Limelight' Dos Pueblos Orchid Co.
Pelleas 'Devonshire', Paul and Marion Miller
Showgirl 'Glamour Jane', Santa Barbara Orchid Estate
The Dave McLean Award of Distinction to Pinafore 'Comet', Frank Fordyce Orchids.

This just about brings us up-to-date on the miniature hybrids for not all of them can be mentioned here. There are more crosses to flower, some derived from *pumilum,* others from various other species—other second generation hybrids and polymins. There are some 150 registered miniatures with the Registration Authority for Orchids, the Royal Horticultural Society of London.

CULTURE

Miniature Cymbidiums are not demanding in their requirements which include a few basic needs. Happy in a cool greenhouse or out-of-doors in Southern California, they require good light and drainage. Pot culture suits them well in a mix of various combinations of leaf mold, peat moss, redwood wool or chips that drains well. They are not happy in heavy soil. They appreciate being fertilized occasionally and will respond with more and better flowers. They tolerate higher temperatures without loss of flower buds as is the case with larger types when grown too warm at night. It is reported that miniature Cymbidiums flower in Hawaii and Florida and regions of high night temperatures. They also tolerate much cold, even frost. However, it would be desirable to bring them under cover, should we have a severe cold spell such as we had in 1949.

I do not recommend that the novice grow miniatures as house plants except to enjoy them when in flower, for they like plenty of light down to their pseudobulbs with an abundance of fresh air-movement and humidity. Do not try to compensate for lack of humidity by over watering or the roots will rot. On the other hand, do not allow them to dry out completely, but water when the mix is just damp. The idea that Cymbidiums are shade plants must be discarded since they will tolerate, even enjoy morning and afternoon sunlight for they require good light in order to flower. The plants should be repotted every two or three years depending on the condition of the old mix. The same pests that are harmful to larger Cymbidiums may also attack miniatures. These may be controlled by the newer insecticides.

USE OF MINIATURE CYMBIDIUMS

Miniature Cymbidiums make charming gifts for the shut-in, the hospital patient and for special occasions and anniversaries. Their smallness makes them ideal for house decoration when they are in flower. The small flowers lend themselves to lovely flower arrangements. Single flowers can be worn as boutonnieres and they can be worked into attractive corsages. For those who have small greenhouses they offer bright spots of color that do not require the space of larger Cymbidiums. Miniature Cymbidiums are available from most orchid growers in Southern California.

Arboretum Orchid Collection

One of the finest and most comprehensive of any orchid collection, public or private, is to be found at the Los Angeles State and County Arboretum. Started in 1956 with a small collection of *Cattleyas,* today the four greenhouses, each with its controlled temperature, light and atmospheric conditioning, provide proper environment for over one hundred genera and twelve hundred species of orchids from all parts of the world. Through the interest and generosity of the friends of the Arboretum and the California Arboretum Foundation, the collection was started and is being developed to include representative species, primary hybrids, stud parents that have fostered award-winning blooms. The Arboretum Foundation and California garden clubs have sponsored three collecting expeditions to Central and South America that have resulted in valuable additions to the collection, including species not available in most collections and several that had been lost to cultivation for a hundred years. They are now acclimated to the conditions in the Arboretum greenhouses, under the capable direction of the orchid specialist in charge, Mr. Joe Lerchenmuller.

Dr. J. A. Fowlie, Mr. Glenn Hiatt and Dr. George C. Kennedy compiled the list, starting on p. 24 of this issue of Lasca Leaves.

ORCHID SPECIES AND NATURAL HYBRIDS COLLECTION AT THE LOS ANGELES STATE AND COUNTY ARBORETUM, JANUARY, 1966.

ACACALLIS cyanea.
ACINETA chrysantha (syn. *A. densa*), *gymnostele, superba.*
ACROPERA (see also *GONGORA*) *armeniaca, cassidea* (syn. *A. batemannii*), cornuta, galeata (*A.q.* var. *flava*), *horichiana.*
AERANGIS kotschyi, thompsonii.
AERIDES affine, fieldingii, flabellatum, japanicum, lawrenceae, odoratum, racemeiformis, radicosum, vandarum.
AGANISIA pulchella.
AMITOSTIGMA kaiskei.
ANOECTOCHILUS hemesleyana, sikkimensis.
ANGRAECUM comoroensis, eburneum, falcatum, sesquipedale.
ANGULOA clowesii, eburnea, uniflora.
ANSELLIA africana, gigantea, nilotica.
ARACHNANTHE moschifera (*ARACHNIS flos-aeris*).
ARPOPHYLLUM giganteum, spicatum.
ASPASIA epidendroides, (*epidendroides* var. *principissa*), *pusilla, variegata.*
BARKERIA chinense, chinense var. *naevosum, elegans, lindleyana, skinneri, spectabilis, stenopetalum* (not a *Barkeria*), *whartonianum.*
BATEMANNIA colleyi.
BIFRENARIA harrisoniana, longicornis, tetragona, trianthina.
BLETIA alta.
BOLLEA hemixantha, lalindei.
BRASSAVOLA (see also *RHYNCHOLAELIA*) *acaulis, cordata, cucullata, digbyana, flagelaris, glauca, nodosa, perrinii.*
BRASSIA allenii, bidens, caudata, chlorops, gireoudiana, glumacea, lawrenceana, longissima, maculata, maculata var. *major, robertsonii, verrucosa.*
BROUGHTONIA domingensis (syn. *B. lilacina, Laeliopsis domingensis*), *negrilensis, sanguinea, sanguinea* var. *alba, sanguinea* var.*flava* (*'Carmen Gauntlett'*).
BULBOPHYLLUM breviscarpum, lilacinum.
CATASETUM atratum, bicolor, callosum, cristatum, dilectum, discolor, fimbriatum, gnomus, hookeriana, integerrimum, laminatum, macrocarpum, ochraceum, oerstedii, pendulum, pileatum, planiceps, roseum, russelianum, saccatum, soderoi, tenebrosum, thylaciochilum, trulla, uncium, viridiflavum.
uncium, viridiflavum.
CATTLEYA amethystoglossa (syn. *C. guttata* var. *Prinzii*), *aurantiaca, aurantiaca* var. *la Providencia Hort., aclandiae, bicolor, bicolor* var. *alba, bicolor* var. *olocheilos* (*c. grossi*), *bowringiana, bowringiana* var. *Black Prince, bowringiana* var. *splendens, brasiliensis, citrina, deckeri* (syn. *C. skinneri, autumnalis*), *dolosa, dowiana, dowiana* var. *aurea, dowiana* var. *Aurea 'Young's', eldorado, elongata, forbesii, gaskelliana, granulosa, granulosa* var. *russelliana, granulosa* var. *schoefieldiana, guttata, intermedia, intermedia* var. *alba, intermedia* var. *amethystina, intermedia* var. *Aquinii, jehnmanii, labiata, lawrenceana, leopoldii, leopoldii* var. *alba* (Syn. *C. guttata alba*), *leopoldii*

var. *immaculata, loddigesii, loddigesii* var. *Stanley's, leuddemanniana, maxima, mendelii, mossiae, mossiae* var. *Reineckiana, mossiae* var. *R. E. Paterson, mossiae* var. *Wageneri, mossiae* var. *'Yukon Belle' nobilior,* × *O'Brieniana* var. *alba,* × *pachecoi, percivaliana* var. *Orchid Ranch, percivaliana* var. *Summit, porphyroglossa, quadricolor, schilleriana, schroederae* var. *Hercules, skinneri, skinneri* var. *alba, trianae, trianae* var. *Broomhill, trianae* var. *Clinkaberryanum, trianae* var. *Clement Moore, trianae* var. F. E. *Dixon, trianae* var. *Warren Hook, trianae* var. *the Premier, trianae* var. *the President, velutina, violacea, walkeriana, Warscewiczii "Frau Melani Beyrodt", Warscewiczii* var. *sanderae.*

CATTLEYOPSIS lindenii.

CHONDRORHYNCHA (see also *KEFERSTEINIA, WARSCEWICZELLA, COCHLEANTHES*), *albicans, bicolor* (syn. *C. Endresii*), *Chestertoni, fimbriata, lendyana, reichenbachiana.*

CHYSIS aurea, bractescens, bractescens var. *lemminghei, costaricensis, laevis, maculata, tricostata*

COCHLEANTHES aromatica, flabelliformis, heteroclita (syn. *Z. rhombilabium*)

COELIA triptera

COELIOPSIS hyacinthosma

COELOGYNE barbata, × *burfordiense, corymbosa, cristata, dayana, flaccida, fuscescens, grandiflora, massangeana, ovalis, pandurata, speciosa*

COMPARRETTIA falcata, macroplectrum, rosea.

CORYANTHES leucocorys, maculata, macrantha, maculata var. *vitrina, speciosa.*

CYCNOCHES chlorochilon, egertonianum, egertonianum var. *aureum egertonianum* var. *dianae, lehmanii, loddigesii, pentadactylon, ventricosum, warscewiczii.*

CYMBIDIUM aloifolium, bicolor (syn. *C. sinensis*) *canaliculatum* var. *sparksii, devonianum, eburneum ensifolium* var. *Unge Kwannon, insigne* var. *Sanderae, insigne* var. *Westonbirt, lancifolium, longifolium, lowianum* var. *Fir Grange AM RHS, lowianum* var. *"St. Albans", mastersii, pendulum, pumilum, pumilum* var. *Jitsugetsu, pumilum* var. *Yashima, sinense, suavissimum AM RHS, tracyanum FCC RHS, tracyanum* var. *superbum, virescens.*

CYPRIPEDIUM (see *PAPHIOPEDILUM*, correct name for tropical Asiatic slipper orchids)

CYRTOPODIUM broadwayii, palmifolium, punctatum

DENDROBIUM aggregatum, chrysanthum, chrysotoxum, cruminatum, densiflorum, farmeri, fimbriatum var. *oculatum, formosum, formosum* var. *giganteum, jenksii, lawsii, monile, parishii, phalaenopsis, phalaenopsis* var. *schroederae alba, phalaenopsis* var. *Laura Sladden, pierdii* var. *lantinifolium, undulatum, ursula, virginale.*

DENDROPHYLAX funalis

DIACRIUM bicornutum, bilamellatum

ENCYCLIA (see also Epidendrum) *decandollii, atropurpurea* var. *alba, atropurpurea* var. *randii, atropurpureum roseum, brassavolae, ionophlebium, oncidioides, prismatocarpum*

ENDRESIELLA zahlbruckneriana

EPIDENDRUM (see also ENCYCLIA, BARKERIA) *alatum, anceps, arbusculae, aromaticum, boothii, brachyphyllum, burtonii, campylostalix, candollii, ciliare, cinnabarinum, cochleatum, collare, coriafolium, costaricensis, crassilabium, cyanocolumna, diffusum, difforme, endresii, equitantifolium, falcatum, favoris, fragrans, ibaguense, ionophlebium, isomecum, leucopyramis, mariae, mirabile, mosenii, moyobambae, nemorale, nocturnum, nutans, nutans* var. *Dipus, ochraceum, oncidioides, oncidioides* var. *gravidum, oncidioides* var. *perplexum, oncidioides* var. *profusum, oncidioides* var. *ramonense, paniculatum, papillosum, parkinsonianum, parvilobum, patens, pentotis, pfauii, phoenicium, polybulbon, porpax, pseudowallisii, pygmaeum, radiatum, radicans, ramosum, raniferum, rhabdobulbon, roussiana, schlechterianum, schummanianum, spondidulum, stamfordianum, tampense, teretifolium, umbellatum, verrucosum, wallisii, zipheres*
ERIA convolaroides, javonica, merrillii, stellata
ERIOPSIS biloba, wercklei
ERYTHRODES spcs.
EULOPHIDIUM maculatum, sandersianum
EULOPHIA angolensis, caffra, horsfallii, livingstonii, orthoplectora, parvilabus, petersii, zeyberi
GALEOTTIA grandiflora, sp. nov.
GOMEZA incurva
GONGORA (see also *ACROPERA*) *atropurpurea, maculata, maculata* var. *concolor, maculata* var. *tricolor, quinquenervis, portentosa, scaphephorus, truncata, unicolor.*
GRAMMANGIS ellisii.
GRAMMATOPHYLLUM measuresianum, papuanum, scriptum.
GROBYA amherstiae.
HEXISEA bidentata.
HOEHNEELLA trinitatis.
HOULLETIA brocklehurstiana, juruensis, lowiana, tigrina, wallisii.
HUNTLEYA burtii, klugii.
JAQUINELLA teretifolia var. *major.*
JUMELLA gracilipis.
KEFESTEINIA deflexipetala, graminea, helleri, lactea, microcharis, sanguinolenta, subauadrata, wercklei.
KEGELIELLA atropilosa, kupperi, species (?).
KOELLENSTEINIA graminea.
LACAENA bicolor, spectabilis.
LAELIA (see also *SCHOMBURGKIA, RHYNCHOLAELIA*) *albida, anceps, anceps var. alba, anceps* var. *'Chamberlainiana', anceps* × *furfuracea,* × *ancibarina, autumnalis, cinnabarina, crispa, crispilabia, finkeniana* var. *Schroederiana, flava, furfuracea, gouldiana, grandiflora, jongheana, lobata, lundii* var. *Regnellii, monophylla (Neocogniauxia monophylla), ostermeyeri, ostermeyeri* var. *Hoehne Faunier, pumila, purpurata, rubescens, rubescens* var. *alba, rubescens* var. *flava, rupestris, speciosa, xanthina.*
LEOCHILUS oncidioides.
LEPTOTES sp.
LOCKHARTIA acuta, amoena triagulabia, micrantha, oerstedii, pallida, teres.

LYCASTE aromatica, barringtoniae, brevispatha, campbellii, ciliata, cinnabarina (see *denningiana*), *consobrina, consobrina subs. bradeorum, costata, crinita, cruenta, cruenta* × *virginalis,* × *denningiana (ciliata* × *longipetala), deppei, dowiana, dowiana* × *macrophylla, dyeriana, fulvescens, gigantea* (see *L. longipetala*), *lanipes, lasioglossa, leucantha, locusta, longipetala, longiscapa, macrobulbon, macrophylla subs. desboisiana, macrophylla subs. filomenoi, macrophylla subs. macrophylla, macrophylla subs. measuresiana, macrophylla subs. panamanensis, macrophylla subs. puntarenasensis, macrophylla subs. xanthocheila, mesochlaena, powellii, schilleriana, skinneri, skinneri* var. *alba,* var. *armeniaca,* var. *bicolor,* var. *delicatissima,* var. *marginata,* var. *nigropunctata,* var. *vestalis,* var. *tricolor,* var. *purpurea,* var. *purpurata, tricolor, xytriophora.*

MASDEVALLIA calura, caudata, chontalensis, ecaudata, elephanticeps, erythrochaete, harryana, horrida, ignea, laucheana, platyglossum, reichenbachiana, rolfeana, schlimii, schroederiana, tovarensis, triastele, vellifera.

MAXILLARIA camaridii, carullota, crassifolia, densa, erythrochaete, houtteana, luteo-alba, nagelii, nigrescens, ochroleuca, praestans, princeps, rufescens, tenuifolia, variabilis, wercklei.

MEIRACYLLIUM trinasutum, wendlandii.

MENADENIUM rostratum.

MILTONIA bluntii, clowesii, cuneata, endresii, flavescens, phalaenopsis, regnellii, regnellii var. *aurea, roezlii, schroederiana, spectabilis, warscewiczii.*

MORMODES aromaticum, atropurpurea, buccinator, cartonii, colossus, convolutum, ephippilabia, sp. nov., histrio, hookeri, horichii, igneum, lawrenceanum, luxatum, nagelii, maculata var. *maculata, maculata* var. *unicolor, punctatum, rolfeanum, roseum, skinneri, stenoglossum, variabile, vernixeum, vinaceum, wendlandii.*

NAGELIELLA purpurea.

NEOCOGNIAUXIA monophylla.

NEOMOOREA irrorata.

NEOBENTHAMIA gracilis.

NOTYLIA bicolor.

ODONTOGLOSSUM bictoniense, cariniferum, cervantesii, chiriquensis, convallaroides, egertonii, grande, insleavi, krameri, krameri var. *alba maculatum, oerstedii, pendulum, pulchellum, schlieperianum, schlieperianum* var. *flavidum, stenoglossum, triumphans, uro-skinneri, williamsianum.*

ONCIDIUM ampliatum, altissimum, ansiferum, abortivum, asparagoides, baueri, bicallosum, cabagre, carthaginense, cavendishianum, cebolleta, cheirophorum, citrinum, crista galli, confusum, gauntlettii, ghiesbreghtianum, globuliferum, guttatum, haematochilum, hastatum, hellerii, heteranthum, hyphmaticum, incurvum, jamaica, krameriamum, krameriamum (xanthochromic form), lanceanum, lankasteri, leiboldii, leuchochilum, liebmannii, longifolium, luridum, maculatum, microchilum, obryxanthum, ochmatochilum, ornithorhynchum, orthostates, panamanense, papilio, pittieri, pulchellum, sanderae, sarcodes, sphacelatum, splendidum, stenotis, stipitatum, stramineum, tetrapetalum, tigrinum, titania, triquetrum, tuerckheimii, varicosum var. *Rogersii, variegotum, warscewiczii, wentworthianum.*

ORNITHIDIUM fulgens.

ORNITHOCEPHALUS bicornis, cochleariformis, inflexus, iridifolius.

OTOSTYLIS brachystalix.
PAPHINIA cristata, cristata var. *"modiglianiana", grandiflora.*
PAPHIOPEDILUM amabile, appletonianum, argus, barbatum, bellatulum, boxalii, bullenianum, callosum, charlesworthii, ciliolare, concolor, curtisii, curtisii var. *'Sanderae', dayanum, delenatii, exul, fairreanum, godefroyae, godefroyae* var. *Lasca, godefroyae* var. *leuchochilum, glanduliferum, glaucophyllum, gratrixianum, haynaldianum, hirsutissimum, hookerae, insigne, insigne* var. *'chantinii', insigne* var. *'Harefield Hall', insigne* var. *maulei, insigne* var. *'Sanderae', javanicum, lawrenceanum, lowii, mastersianum, niveum* var. *Ang Thong, parishii, philippinense, praestans, purpuratum, Rothschildianum, spicerianum, stoneii, sublaeve, sukhakulii, superbiens, tonsum, venustum, villosum, villosum* var. *Boxallii, victoria mariae, violascens, virens, volonteanum, wardii, wolterianum.*
PERISTERIA elata, guttata, pendula.
PESCATOREA cerina, dayana, dayana var. *candidula, dayana var. rhodacra, lehmanni, klabochorum, wallisii.*
PHAIUS grandifolius, maculatus maculatus var. *minor.*
PHALAENOPSIS amabilis, aphrodite, equestris var. *Marfa, esmeralda, esmeralda var. violacea, esmeralda* var. *purpurea, formosum, intermedia* var. *Portei, lueddemanniana, lueddemanniana* var. *boxallii, lueddemanniana* var. *hieroglyphica, lueddemanniana* var. *McCloud, lueddemanniana* var. *Mindanao, lueddemanniana* var. *ochrachea, lueddemanniana* var. *pulchra, lueddemanniana* var. *purpurea, maculata, mannii, schilleriana, stuartiana, violacea.*
PHOLIDOTA imbricata.
PHRAGMIPEDIUM boisserianum, caricinum, caudatum, klotzschianum, longifolium, schlimii, x sedenii var. *candidulum.*
PLEUROTHALLIS ghiesbrechtiana, glomerata, immersa.
POLYCYCNIS barbata, gratiosa, sp. nov., muscifera.
POLYSTACHYA luteola.
RENANTHERA monachica.
RHYNCHOLAELIA digbyana, digbyana var. *fimbripetala, glauca, glauca* var. *alba.*
RHYNCHOSTYLIS violacea.
RODRIGUEZIA fragrans, secunda, Teuscheri.
RUDOLFIELLA aurantiaca.
SACCOLABIUM dasypogun.
SCAPHYGLOTTIS lindenii.
SCHLIMMIA jasminodora, trifida.
SCHOMBURGKIA brysiana (syn. *S. tibicinis grandiflora*), *crispa, humboldtii, humboldtii* var. *alba, lueddemanniana, lyonsi, lyonsia* var. *alba, sawyeri, superbiens, tibicinis, thomasonia* var. *thomasoniana* (white and purple), *thomasoniana* var. *atropurpurea* (yellow and purple), *undulata, weberbaueriana, wendlandii.*
SCUTICARIA steelii.
SIEVEKINGIA fimbriata, suavis.
SOBRALIA leucoxantha, lindleyana, macrantha.
SOPHRONITELLA violacea.
SOPHRONITIS cernua, coccinea, grandiflora, pterocarpa.
SPATHIGLOTTIS microchilina, plicata.

STANHOPEA anfracta, bucephalus, candida, cirrhata, connata, costaricensis, devoniensis, eburnea, ecornuta, florida, × fowlieana (ecornuta × costaricensis), grandiflora (HBK ex Rchb. F) Rolfe, graveolens, guttulata, oculata, platyceras (syn. S. Madouxiana), pulla, saccata, shuttleworthii, tricornis, tigrina, wardii.
STAUROPSIS fasciata, lissochiloides.
STELIS atro-rubens, endresii, guatemalensis, ophioglossoides.
STENIA chasmatochila sp. nov., pallida.
STENOGLOTTIS longifolia.
STENORRHYNCHUS speciosus.
TAINIA hookeriana.
TEUSCHERIA Sp. Nov.
TRIGONIDIUM lankasteri, semanii.
THUNIA alba.
TRICHOCENTRUM candidum, tigrinum var. *splendens, maculatum.*
TRICHOCERAS parviflora.
TRICHOGLOTTIS brachiata var. *philippinensis.*
TRICHOPILIA coccinea, fragrans, maculata, marginata, sanguinolenta, sp. nov., suavis, subulata, torticollis, turrialbae.
TRIGONIDIUM egertonianum.
VANDA coerulea, roeblingiana. sanderiana, sanderiana var. *"Country Acres", suavis, tricolor.*
VANILLA barbalata, dillonianum.
WARREA costaricensis.
WARSCEWICZELLA (see also *CHONDRORHYNCHA, KEFERSTEINIA, COCHLEANTHES*), *amazonica, caloglossa, discolor, gibeziae, lipscombiae, marginata, wailesiana.*
XYLOBIUM elongatum, foveatum, palmifolium, sulphurinum.
ZYGOPETALUM (see also *COCHLEANTHES, CHONDRORHYNCHA, KEFERSTEINIA, WARSCEWICZELLA, PESCATOREA, HUNTLEYA*), *brachypetalum, crinitum, intermedium, mackayi, triste.*

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SUCCULENT GROUNDCOVERS

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ON THE COVER:

Iceplants in full bloom turn this lawn into a sea of vivid colors. This is an illustration of succulents at their best, used as low-maintenance groundcovers in a pleasing design, utilizing companion plants as specimens.

PHOTO BY HORT-PIX.

Succulent Groundcovers

IN THIS ISSUE:

The use of succulents as groundcovers is particularly timely, for these fleshy-leaved, drought-resistant plants are the first ones suggested whenever the subject arises relative to lawns that need little care. They appeal to the increasing number of people who can give little attention to the lawn and garden in summer, to those with boats, summer homes at the ocean or in the mountains. And those millions who take extended vacations welcome a groundcover that can be left in the care of the not-too-attentive teenager next door or the haphazard (especially when you're away) gardener.

Southern California, because of its suitable climate, has pioneered in this novel use of succulents. We have taken succulents out of the rock gardens where they were grown as merely specimens and assigned them to important landscape uses for lawn substitutes and erosion control. Admittedly a wide expanse of the same plant becomes monotonous but judicious use of rocks, colored gravel or plants with a similar culture has enlivened our lawns and enriched our gardens. Plants that adjust to the culture of succulents include junipers (tamarisifolia is a favorite), pines, bottlebrush, feathery cassia, purple hopbush (Dodonea), lantana and rosemary. Several other groundcovers may be planted adjacent to succulents and given the same care. These include gazania, verbena, statice (Limonium), ivy geranium, bush morning glory, sea thrift, mondo grass, periwinkle and thyme.

Among the most artistic landscapes are those using various combinations of species and varieties of succulents. They come in a wide array of leaf colors for good year 'round appearance and they offer an abundance of both vivid and pastel shades in flower color.

Of course succulents have been used for formal beds from time immemorial. Rich scrolls, intricate clocks and fancy gates have been created with the rosette forms, but these are becoming rare, along with the scarcity and high cost of trained labor. They serve as a reminder, however, of the great diversity and beautiful colors available in these plants.

Contributions from Myron Kimnach and Carl Zangger compose this issue. A native of Los Angeles, Myron serves as assistant manager of the University of California Botanical Garden at Berkeley from 1951 until 1962 when he accepted the position of Curator of the Huntington Botanical Gardens. He is the author of numerous publications in the Cactus and Succulent Journal and has made five expeditions to Mexico and one to Honduras in search of new plants.

Carl Zangger was born in Iowa and came to California at a very early age. He was educated in the Pasadena schools and at the age of 15 started working in the Tuttle Bros. Nursery of Altadena. Except for a brief stint as representative of Sweeney, Krist and Dimm after Tuttle Bros. closed its doors, he has been associated with Jim Perry and is presently vice president of Perry's Plants, Inc. He is also currently the vice president of the California Association of Nurserymen.

The Editor

Groundcover Succulents for California

By Myron Kimnach
Curator
Huntington Botanical Gardens

INTRODUCTION

One of the sights that impress visitors to California is the profusion of succulents that grow freely in the open, rather than in glasshouses or on windowsills. Native Californians, or those long resident here, take these plants very much for granted and often use them extensively in their gardens, either for mass-planting a separate section or as groundcovers on a slope.

This use of succulents is hardly mentioned in the vast succulent literature, nearly all of which was written by enthusiasts in colder climes, where such plants are grown indoors in pots. Growers in California and other areas of similar climate, such as the Mediterranean coast, Australia, South Africa and the drier tropics, have to find out by trial and error what succulents will do best under their conditions. This article is an attempt to summarize the knowledge so far gained in this field. It will discuss the use and care of these plants, and describe those kinds best suited for mass-planting; a concluding table will contain data about these and other species.

DEFINITIONS

What is a succulent?

Let us first define our terms. Everyone has seen a succulent, but few can properly define one. Although the dividing line between succulent and non-succulent is not exact, one may say that a succulent is a plant with thick leaves and/or stems for storing moisture as an adaptation to a seasonally dry climate. Nearly all cacti are succulents, but only some succulents are cacti. Besides the cactus family, there are over twenty-five plant families containing succulents; some large families, such as the daisy family, include only a few.

What is a groundcover succulent?

"Groundcover" is also a most inexact term, but, in the sense it is used in this article, a groundcover succulent is one which grows compactly and attains a height of less than eighteen inches (or rarely up to six feet); it must also be suitable for mass planting in an outdoor garden.

USING SUCCULENTS

For erosion control.

Freeway travelers are familiar with embankments covered with the rank creeper, *Carpobrotus edulis* (Hottentot Fig), a difficult-to-kill succulent that survives exhaust fumes and drought. Although not a particularly attractive species, it quickly forms a sea of green, dotted with numerous, large, white to pinkish flowers, and it is certainly preferable to bare soil or concrete. Erosion would, of course, be a great problem on these steep banks if some groundcover were not

used, and watering would also be difficult if such a drought-resistant species were not chosen.

The home gardener is not likely to use this coarse grower unless he has great expanses to cover. With cut-and-fill lots common in our hilly area there is often at least one steep bank to be covered, and a number of excellent species can be used for this purpose. Among the best are various members of the mesembryanthemum family (to which *Carpobrotus* belongs): *Drosanthemum hispidum,* an earth-hugging, extremely dense mat with purple flowers, blinding in their intensity and profusion — a fault in some person's eyes and one reason it is not used for highway planting; and some species of *Malephora* and *Lampranthus,* providing that they creep and do not simply form a small bush — in the latter case the soil-holding capacity is less.

Useful soil-binding succulents from other families are: *Senecio mandraliscae, Portulacaria afra* 'Variegata', *Graptopetalum paraguayense, Sedum rubrotinctum* (incorrectly called *S. guatemalense*), *S. moranense, S. dendroideum* subsp. *praealtum* (though it may reach three feet in height), *S. album, Echeveria elegans, E.* × *set-oliver* and *E. gilva* (all echeverias must be planted closely, for they do not creep).

One of the commonest succulents, *Sedum dendroideum* subsp. *praealtum,* has bright yellow flowers that provide much color in early spring.

For dry areas.

Sometimes succulents are utilized, not for their appearance, but because they will need little water. There's no denying that succulents do need less water than any other type of plant. However, those who have grown succulents know they need plenty of water if they are to thrive and not just exist. In the Huntington Botanical Gardens the succulents are watered once every week or two in summer, otherwise they soon become unsightly.

The most drought-resistant succulents are cacti, which are excluded from this article because they are more suitable as specimens than as groundcovers. If you withhold much water from the other succulents they will tend to lose their leaves. Much of the success of a dry-area planting will depend on the heat and light it will be subjected to in summer.

Those that thrive on little water are few, though agaves and aloes would probably be the last to die, due to their large, succulent leaves. Some of the echeverias and the larger senecios, such as *S. mandraliscae* and *S. haworthii,* are very resistant — but, again, they will not be ornamental under such treatment.

Good locations for these more tolerant species would be at the ends of beds or parkways where water-sprinklers do not reach, window-boxes or planters which are difficult to water, the dry top of a slope, and in soil too porous to retain water sufficiently.

For ornamental landscaping.

This is by far the most important use for succulents. The major value of these plants, after all, is not their drought-resistance, but the color, compactness and texture of their foliage.

The best introduction to this subject is to see an example of how these plants may be used. Along the western edge of the Desert Garden at the Huntington Botanical Gardens is a demonstration bed nearly a quarter of a mile long, containing many dozens of excellent succulent groundcovers. The planting arrangement shows the qualities of each species by emphasizing contrasts, for each is grouped separately, without the distracting presence of specimen plants. The more frost-tender species are located on the upper slope, which may be five degrees warmer on a frosty night than the lower portion. We are constantly trying out newly introduced species; not all are proving successful and it will be noticed that some are damaged by frost or sun.

In landscaping with succulents, height is the first thing to be considered. The lower growing kinds should be placed nearest paths. Some of the tiniest sedums, forming mats only an inch or two high, are *S. oreganum, S. spurium, S. moranense,, S. spathulifolium,* and *S. album.* Slightly larger species of other genera are *Crassula corallina, Kalanchoe pumila,* and the smaller echeverias.

At the other extreme, in the background and for occasional contrast elsewhere, such taller species as the shrubbery aeoniums and senecios should be used. The tall, bushy *Echeveria coccinea* and *E. spectabilis* are excellent and have especially fine flowers as well. The rather rank, but still attractive *Sedum dendroideum* subsp. *praealtum* soon forms a solid mass up to two feet high, covered with brilliant yellow flowers in early spring. The larger crassulas are slower growing and therefore form more permanent plantings. If many small plants of *Crassula portulacea* (incorrectly known as *C. argentea*) are planted closely together they form an exceedingly dense background planting. This is a most useful species,

both for its shiny, attractively colored foliage and its white or pink winter flowers; although rather tender to frost, it quickly recovers in spring. The showy *C. arborescens* is similar, but rarely flowers and has whitish, red-rimmed leaves. The common *C. tetragona* is valued for its fresh green color and its interestingly four-ranked leaves; it quickly attains a height of two or three feet.

After dealing with the extremes, we turn to the medium-sized species, which comprise the vast majority useful for mass planting. Those that are both excellent and reasonably obtainable are mentioned in the concluding table; the best of these will now be discussed briefly.

Probably the most attention-getting groundcover succulents are the mesembs, which form dense mats and also have brilliant flowers. They do tend to crowd out other succulents, and a wary eye must be kept on any encroachment. In a general collection of groundcovers it is well to keep mesembs to a minimum for this reason and also because their gaudy colors often dominate the more subdued succulents. On the other hand, a whole bank or corner of a bed may be given over to one of these species; one may see *Drosanthemum hispidum*, for example, covering an entire front yard. However, such a blinding mass of color is offensive to many. A gorgeous orange is *Lampranthus aurantiacus* (incorrectly identified in the trade as *L. aureus*) and its equally fine, yellow-flowered cultivar, 'Glaucus'. Spotted here and there in the garden, these can be most effective. *Drosanthemum speciosum* has a stunning flower, burnt orange, with a green center; as the plants do not creep and root, they must be planted closely together. *Cephalophyllum alstonii* remains smaller and its dark, glowing red flower is one of the most beautiful among the succulents.

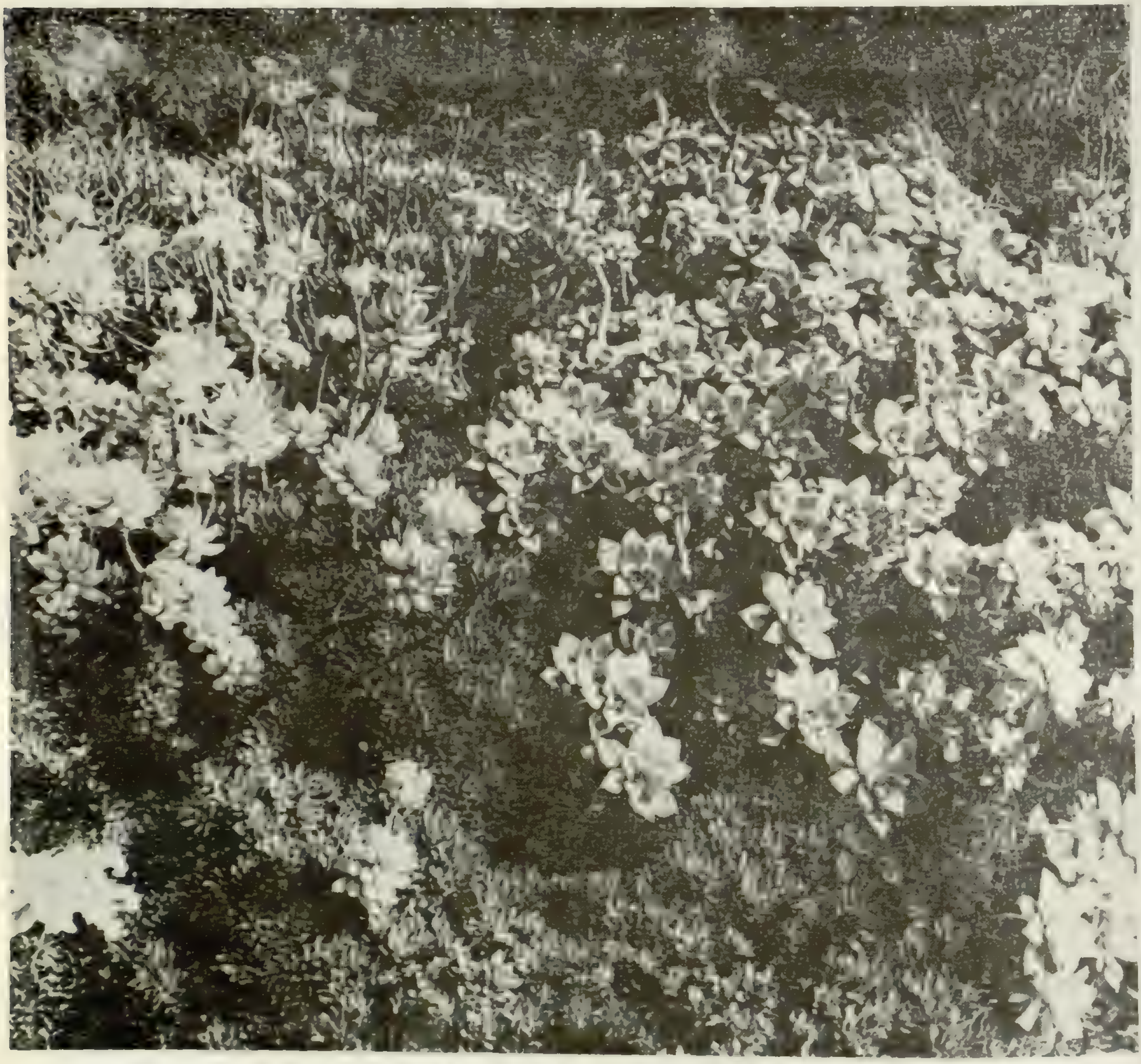
Probably the sedums are the next most useful groundcovers, for they grow densely and are available in a multitude of forms and colors. Some of the most decorative are frost-tender, others do not survive the hot dry summers of Southern California. *Sedum rubrotinctum* is one of the most colorful; its popular name, "Christmas Cheer", refers to its red and green leaves, the red being increased by sun and little water. Of this there is also a variegated cultivar, 'Aurora', which has distinctive pink foliage. *S. pachyphyllum* is similar, with rosy leaf-tips. Some of our better native species, such as *S. spathulifolium* and *S. oreganum*, are best in cooler sections of the state. Some sedums have special uses: *S. morganianum*, usually grown as a basket plant, makes a fine groundcover on a steep, shady bank with sufficient water.

Sedum dasyphyllum is here cleverly used as a substitute for a paving stone, though it would not bear up under heavy foot-traffic.

Of the crassulas, the most spectacular is *C. falcata*, one of the best of flowering succulents; it is not a creeper, and many small plants must be placed together to obtain a mass effect, but the effort is repaid in spring when the showy, scarlet flowerheads appear. The compact, silvery grey leaves are a perfect contrast for

the brilliant flowers. *C. radicans* is notable for its summer leaf-color, bright red in sun and with little water; in winter, though, it becomes an ordinary green and loses much of its appeal.

A relative of *Sedum, Graptopetalum paraguayense,* is one of the most colorful of the medium-sized groundcovers. Of a strange pinkish grey color (presumably the reason for its popular name, "Ghost Plant"), its rosettes quickly form a dense cover, which is especially attractive on a slope.



A nicely textured blending of two of the best groundcovers:
Graptopetalum paraguayense (above) and a hybrid of *Aeonium simsii* (below).

Being rather frost-tender, the kalanchoes are most useful near the coast. In general they are weedier in growth than the more extreme succulents, but often this contrast may be needed. Some forms or hybrids of *K. blossfeldiana* are popular house plants, grown entirely for their orange to red flowers; a red-flowered strain with reddish leaves is one of the best for outdoor mass-planting. The best

of the taller kalanchoes are: *K. grandiflora, K. longiflora* 'Coccinea' (a beautiful thing, with its flame-red leaves, but particularly liable to cold damage), *K. marmorata,* with its handsome spotted leaves, and the tender but very fine *K. tomentosa,* with felty brown-edged leaves. One of the best of recent introductions is *K. pumila,* a true jewel of the succulent world. It hails from the higher altitudes of Madagascar and appears to be hardier than most of the genus. This dwarfish plant, some six inches high, has small, compact, purplish-tinged, silver leaves, and produces violet flowers as an added attraction.

Echeverias (popularly known as "Hen-and-chickens") are not creepers, but they make fine groundcovers if planted closely together. The smaller types that are outstanding and available (some only with a little searching) are: *E. elegans,* with striking, bluish white rosettes that rapidly offset; the rather similar *E. simulans, E. potosina* and *E. secunda;* and *E. derenbergii* and *E. lutea,* the latter with bright, canary-yellow flowers. The much larger *E. pallida* is now frequently seen in California; its leaves are a fresh, pale green and the flower stalks a glowing pink. Unfortunately, it is subject to sunburn and frost damage and is a great attraction for snails. Some echeverias form low, dense masses: *E.* 'Doris Taylor', *E.* × set-oliver, *E. harmsii* (a shade-lover with fine scarlet flowers), *E. linguaefolia, E. microcalyx, E. amoena, E. pilosa, E. pulvinata* (especially good because of its rose-flushed, woolly leaves). Among other choice members of this fascinating genus: *E. agavoides,* with handsome, red-edged leaves, the jade-green *E. gilva,* the nearly black *E. affinis,* the densely hairy *E. setosa.*

BEST FLOWERING KINDS

Although succulent groundcovers are not grown primarily for their flowers, some of the latter are indeed beautiful. The showiest belong to the mesembs, or "ice-plants", which, it is true, are often on the garish side. Be sure to plant them where they get mid-day sun, for, with few exceptions, the flowers open widely only at that time. Of the non-mesembs, *Crassula falcata* is the most colorful in flower, *C. portulacea* and *Sedum dendroideum* subsp. *praealtum* following close behind.

LEAF COLOR

Though each species' leaf color is given in the concluding table, some general comments can be made here. Surprisingly, few pure colors are found in succulent leaves, most being blends and pastels. The following show the clearest coloring:

White: *Senecio haworthii (Kleinia tomentosa), Crassula corallina, Kalanchoe pumila* (purplish in sun), *Echeveria elegans.*

Yellow: *Sedum nussbaumerianum.*

Brown: *Sedum stahlii.*

Red: *Kalanchoe longiflora* 'Coccinea', *Crassula radicans, Sedum rubrotinctum* (only in full sun), *Echeveria pulvinata, Sedum craigii* (purplish).

Blue: *Senecio mandraliscae, S. serpens (Kleinia repens).*

Green: *Portulacaria afra, Sedum dendroideum* subsp. *praealtum, Echeveria coccinea, E. linguaefolia.*

Black: *Aeonium arboreum* 'Zwartkop'.

PLANTING: THE SECRET OF CONTRAST

It takes the same technique and viewpoint to blend the colors and textures of succulents as it does to use a palette of paints. In a sense, then, you will be "painting with plants" as you landscape. If one really desires an attractive planting, not just an interesting collection of plants, it is necessary to proceed with a plan in mind and to maintain the design afterwards.

Providing the plants will do well in the spots you have selected, and providing also that you have considered their mature height, you must then display their qualities to best advantage. Contrast is of the greatest importance. If you plant two white-leaved species next to each other you are obtaining just half the effect you could have had by separating the two with plants of another color. Contrast in height is important as well; generally speaking, lower plants should be next to paths, roads and specimen plants, but an occasional larger plant near the border will be useful to stimulate the viewer's eye. Texture can be exploited by placing a small, fine-leaved succulent next to a taller, coarse-leaved one, thus emphasizing the distinct character of each. On the other hand, to avoid the "spotty" effect resulting from too rigid a use of contrast, it is well at times to connect extreme types with intergrading ones.

To avoid the effect of an unbroken sea of plants, rock can be of great importance — the results of its use can also be pretty awful if care is not taken. One must avoid the "plum-pudding effect", referred to in all works on rock-gardening; don't just scatter the rocks here and there on the soil surface — they should be burried at least half-way, and fitted together so they appear to form protruding ridges or strata. It is important, if a natural appearance is desired, to use the same rocks in the same part of the garden; white rock is best avoided altogether.

The principles of proper landscaping with succulents are little different than those used for more conventional plants. Designing an alpine rock-garden is the nearest equivalent, but because of our very un-alpine climate this art is seldom practiced here. If you really are concerned about this aspect of our subject, read some good books on landscape design. The basic principles still apply.

CULTIVATION

If you intend growing anything more demanding than *Carpobrotus edulis* (our freeway groundcover), you will have to become involved with cultivation. Not that species recommended here are difficult — it's just that growing them together causes difficulties because not all thrive under the same treatment.

Hardiness.

Let us take resistance to cold, for example. Temperatures are never the same in any two places in the same garden on the same night. If a difference of four degrees exists within your garden, it stands to reason that the more tender species should be kept in the warmer places. Most aeoniums and kalanchoes are rather tender — give them plenty of sun, and preferably afternoon sun, so that if frozen they will not thaw too quickly next morning. Plant them against buildings, but where cold air may flow away and not be trapped, and plant thickly so the stems protect each other. If plants freeze, leave as much as possible of the dead growth until the frosts are over, otherwise you merely expose new portions to more cold. Often it will help if a more tender sort is planted under, or in the down-wind side of, a taller, hardier species.

A living mosaic of succulents: *Agave americana* 'Marginata' (upper left), *Crassula portulacea* (upper right), *Agave attenuata* (at left), *Aeonium* (at right), and *Sedum rubrotinctum*

Light exposure

Light is another factor to consider if a number of kinds are grown together. In the genuine deserts of Southern California you will find that many non-native succulents will not withstand full sun even if watered sufficiently — probably all should have at least a little afternoon shade. Nearer the coast nearly all will prefer sun, though there are a few that look best with a little shade, at least in Southern California: *Sedum morganianum, Crassula lycopodioides, Echeveria pallida, E. coccinea, E. harmsii,* haworthias.

Watering

Moisture requirements among succulents vary strongly also. Those liking more water are haworthias, *Sedum morganianum,* kalanchoes, the thinner-leaved sedums; happier on the dry side are such echeverias as *E. lutea.* Between these extremes are the great majority of succulents. One can grow all three groups together by planting the moisture-loving ones in the lower part of the planting, or where their roots can seek moisture beneath rocks, while the more drought-resistant ones can be restricted to higher, better-lit areas. The whole secret of watering succulents is to find out from experience the least amount needed to keep them in a healthy *and colorful* condition; remember, the more water, the less colorful the leaves. An established planting should not need water more than once a week, and probably less, but one must never put watering on a regular schedule; frequency can be determined only by the appearance of the plants and by how quickly the soil dries.

Alkaline water, so common in our area, has not proven a serious problem with succulents grown in the ground. If your water is unusually alkaline, a prolonged soaking once or twice during summer will leach out much of the salts.

Occasionally, during heavy winter rains, some plants may rot off at the ground-level. The growing tips, with all rotting parts removed, can be rooted easily in flats so that when spring arrives a new planting can be made quickly.

Proper soils

This is really not an important subject where outdoor succulents are concerned. Succulents will *exist* in almost anything if watering and feeding are modified accordingly. However, they definitely do not *thrive* in pure sand, or even half-sand, or in hard adobe or clay, though on a steep slope many will grow fairly well in the latter soil-types. If your soil is reasonably well-drained it will probably do; if, even with correct watering, your plants do not seem healthy, try light fertilizing at the beginning of the growing season. Do not fertilize late in the summer, and not even in late spring with such summer-dormant kinds as the aeoniums.

REPLANTING AND PROPAGATION

Although comparatively slow-growing, succulents must be pruned back, replanted and propagated like other plants, otherwise your original design will gradually degenerate. Spring is the proper time for this activity; summer may be too hot to establish cuttings of some species, though it can usually be done by rooting in flats; fall is too near the wet and cold season. Although unrooted cuttings of some succulents can simply be inserted in the spots where you want them to grow, there will be less rotting or dessication if you dry the cuttings from three to seven days in a half-shady place, then root in flats of dry, sandy soil. Cuts of shrubby mesembs (lampranthus, malephora, drosanthemum, etc.) should not dry more than a day and the rooting medium should be kept damp. To avoid rotting, the lowest leaves of a cutting should be removed when the stem is inserted in the soil. In some creeping species the stems should be laid horizontally to root.

It is well-known that many succulents (particularly of the crassula family) are easily propagated from leaves; if these are broken off carefully and laid on their sides in a pot or flat out of direct sunlight they will send out roots and usually a shoot as well. Leaf propagation is slow and need not be resorted to when cuttings are easy to root — however, it *is* pleasant to watch the little plants emerging from the leaves and their gradual growth to maturity.

Insect pests

Yes, insects are a problem with succulents too. Some familiar ones, such as whiteflies and caterpillars, cause little trouble because they apparently do not like the fleshy, waxy leaves. Aphids attack flower stalks, mainly, and can soon make members of the crassula family unattractive; a weak dose of Malathion quickly solves the problem. Mealybugs can be serious where potted, indoor succulents are concerned, but are a minor pest outdoors. Probably the succulents' most troublesome affliction is nematodes, tiny worms that burrow into the roots and gradually weaken the plant. The Crassulaceae, again, seem most susceptible. About the only thing to do is root tip-cuttings, sterilize the soil with fumigant or nematicide. and then replant. Often nematodes do not greatly harm succulents, especially if they are more heavily watered or fertilized, but the psychological effect on the grower is depressing, to say the least, when he sees the ugly knobs on the roots of his plants. Try to obtain clean plants to begin with; examine the roots before planting, and when in doubt root the tip and destroy the older portion. Hopefully, science will soon develop a practical systemic soil-drench suitable for succulents.

OBTAINING PLANTS

Larger, general plant nurseries carry many of the species mentioned here, either in their ground-cover or succulent sections. The great majority of species can be obtained from the larger cactus-and-other-succulent nurseries, with which Southern California is unusually well-endowed. You will find it expensive to buy large numbers of plants from such sources, but, if you are patient, in a year or two you can easily propagate a surprising number of plants from just one specimen. Rarer sorts may be obtained from nurseries, collectors or societies listed in the Cactus and Succulent Journal (see below, under Recommended Books).

RECOMMENDED SUCCULENTS

Below are listed some of the species we can recommend for groundcovers or mass-planting. Many others are omitted because of excessive rarity or as being unsuitable for our climate. Besides the scientific names, some popular names are given, though few succulents have acquired one. Also given are some widespread but incorrect names often used in the trade; mesembs, especially, are often badly misidentified.

In the column listing geographic origin, "Hort." signifies that such plants are apparently of horticultural origin and are not known from the wild state.

Cold-hardiness is judged by ability to survive in one of four ranges:

1: less than 20°F.
2: 20 - 25°
3: 25 - 30°
4: not below 33°

Availability is rated in three grades:

1: obtainable from large, general nurseries
2: obtainable from succulent nurseries
3: difficult to obtain

Name	Native of:	Ht.	Leaf color	Hardiness	Availability	Comments
CRASSULACEAE						
Aeonium arboreum	Mediterranean	3′	green	2	1	A good background plant
A. arboreum 'Atropurpureum'	Hort.	3′	black, green	2	1	Nearly black-leaved variant
A. arboreum 'Luteovariegatum'	Hort.	3′	yellow, green	2	3	Handsome variegation; needs some shade
A. arboreum 'Zwartkop'	Hort.	3′	black, brown	2	3	New introduction with intensely black leaves
A. decorum	Canary Is.	2′	gray, pink	2	2	A neat and compact shrub
A. haworthii	Canary Is.	3′	blue-gray	2	2	Excellent in the background
A. simsii (A. caespitosum) hybrid	Hort.	1′	green	2	2	Unnamed, yellow-flowered hybrid forming neat mounds
Cotyledon barbeyi	E. Africa	2′	green or white	4	3	The white forms are good background shrubs for frost-free areas
C. ladismithiensis	S. Africa	6″	green, brown	3	3	Delightful novelty with fuzzy brown-edged leaves
C. undulata	S. Africa	2′	white	3	2	Pure white, wavy-edged leaves
Crassula arborescens	S. Africa	6′	white, red	2	1	Whitish, red-margined leaves; a fine background plant
C. corallina	S.W. Africa	2″	white	2	2	A white mat of pebbly texture
C. deltoidea	S. Africa	3″	white	2	2	Larger version of above
C. falcata	S. Africa	1½′	white	2	1	A beauty, both in leaf and flower
C. lactea	S. Africa	1′	green	2	1	Especially compact, and with pretty white flowers
C. perforata ("Necklace Vine")	S. Africa	1′	gray-green	2	1	Leaves are "strung" like beads on a string
C. portulacea ("Jade Tree") *(C. argentea)*	S. Africa	6′	green	2	1	The best background plant; showy winter flowers
C. radicans	S. Africa	6″	green or red	2	2	Bright red leaves if planted in sun

C. rosularis	S. Africa	3″	green-brown	2	2	Clustering, flat rosettes
C. rupestris	S. Africa	1′	gray-green	2	2	Another, more prostrate "Necklace Vine"
C. schmidtii	S. Africa	3″	green	2	2	Profuse red flowers
C. tetragona	S. Africa	2′	green	2	1	Another excellent shrub for mass planting
Dudleya brittonii	Baja Calif.	1′	green or white	2	2	Superb white rosettes; plant closely
D. edulis	S. Calif.	6″	gray-green	2	2	Wide masses of pencil-like leaves
D. greenei	S. Calif.	6″	green or white	2	3	Both green and white forms offset profusely
Echeveria affinis	Mexico	3″	brown-black	2	3	"Black Echeveria"; needs shade in S. Calif.
E. agavoides	Mexico	6″	green, red	2	2	Some red-edged forms are stunning; plant closely
E. amoena	Mexico	3″	green	2	2	Tiny, dense rosettes forming a mat
E. coccinea	Mexico	2′	green	2	2	Good shrubby background plant
E. derenbergii	Mexico	3″	white-gray	2	2	Delightful species with good flowers
E. 'Doris Taylor'	Hort.	6″	white-green	2	2	Soft, hairy ground-cover
E. elegans	Mexico	3″	white	2	2	If planted closely, low mats are formed
E. expatriata	Mexico	4″	gray-pink	2	2	Similar to *E. amoena*
E. gigantea	Mexico	1′	green, red	4	3	Tender but beautiful, with red-edged leaves
E. gilva	Mexico	3″	gray-green	2	2	Similar to *E. elegans,* but with distinctive color
E. harmsii	Mexico	1′	green	3	2	Showy flowers; give plants shade and water
E. X imbricata	Hort.	6″	gray	2	1	Common and tough
E. linguaefolia	Mexico?	6″	green	3	2	Valuable for low growth and fresh green color

Name	Native of:	Ht.	Leaf color	Hardiness	Availability	Comments
E. lutea	Mexico	3″	brown	2	3	Bright yellow flowers; plant closely in light shade
E. microcalyx	Mexico	3″	blue-green	2	2	A dense mat-former
E. pallida	Mexico?	1′	green	3	2	Light green beauty with pink flower stalks
E. pilosa	Mexico	6″	green-white	2	2	Woolly, spreading rosettes
E. potosina	Mexico	6″	white	2	2	Like *E. elegans,* but with better shape
E. pulchella	Mexico?	3″	green	2	2	Another densely growing mat
E. pulvinata	Mexico	1′	green-red	2	2	Red-flushed leaves are decorative
E. X set-oliver	Hort.	1′	gray green	2	2	Good mass plant, fine flowers
E. setosa	Mexico	3″	green	2	2	Woolly, compact rosettes; shade and good drainage
E. spectabilis	Mexico	2′	green-red	3	2	Large shrub with showy flowers
E. subrigida	Mexico	1′	white	3	3	Large white rosettes—superb! Needs light shade
Graptopetalum amethystinum	Mexico	6″	pink	3	2	Lovely color; needs good drainage
G. macdougallii	Mexico	3″	blue-green	3	3	Rapidly forming mats; new and potentially good
G. pachyphyllum	Mexico	3″	gray, red	3	3	Dainty, dense; light shade
G. paraguayense ("Ghost Plant")	Mexico?	1′	pink-gray	2	1	Old standby and hard to beat
Greenovia aurea	Canary Is.	6″	blue-green	3	2	Rose-like rosettes; needs light shade
Kalanchoe blossfeldiana	Madagascar	1′	red-green	3	1	Colorful foliage and flowers, the latter red to yellow
K. grandiflora	E. Africa	3′	blue-green	3	3	Good mass plant, with pretty yellow flowers

K. longiflora 'Coccinea'	Hort.	1′	red, green	4	3	Rare, tender, but worth striving for
K. marmorata	N.E. Africa	1½′	gray, brown	3	2	Handsomely spotted leaves
K. pumila	Madagascar	1′	gray-purple	2	2	A gem, little tried as yet
K. synsepala	Madagascar	1′	green	3	2	Forms clumps of large rosettes
K. tomentosa ("Panda Plant")	Madagascar	2′	gray, brown	3	2	Woolly, brown-margined leaves
Pachyphytum bracteosum	Mexico	6″	gray-pink	2	2	Attractive leaves; plant closely
P. coeruleum	Mexico	3″	blue	3	3	Dense, blue leaves; new and promising
Rochea coccinea	S. Africa	2′	green	2	2	Showy scarlet flowers; plant closely
Rosularia pallida	Asia Minor	3″	green	2	2	Forms dense, woolly mats; light shade in S. Calif.
X Sedeveria hummelii	Hort.	6″	green-red	2	2	Hybrid between *Sedum* and *Echeveria;* good cover plant
Sedum album ("*S. brevifolium*" of the trade)	Europe	3″	green	2	1	Often a pest, but valuable as a carpet-like cover
S. anglicum	Europe	3″	green	1	1	Moss-like and of a cheerful green
S. confusum	Mexico	1′	green	3	1	Fills in quickly and remains low
S. craigii	Mexico	3″	purple	3	2	Excellent color; light shade in S. Calif.
S. dendroideum subsp. *praealtum*	Mexico	4′	green	2	1	Rank but valuable; flowers bright yellow
S. moranense	Mexico	3″	green	2	1	Similar to *S. album,* but less obnoxious
S. morganianum ("Burro's Tail")	Mexico?	3″	green	3	1	Best as a basket plant, but good on slope in shade
S. nussbaumerianum	Mexico	1′	yellow	2	2	Nearly yellow, and shaped well too
S. oreganum	W. U.S.A.	2″	green	2	3	A dainty mat-former; not for hot, sunny places
S. pachyphyllum	Mexico	1′	green, red	2	2	A cheerful red-green

Name	Native of:	Ht.	Leaf color	Hardiness	Availability	Comments
S. rubrotinctum ("Christmas Cheer") *(S. guatemalense)*	Mexico?	6″	green, red	2	1	One of the best; will crowd out smaller species
S. rubrotinctum 'Aurora'	Hort.	6″	pink	2	3	Distinctive pink variant; light shade in S. Calif.
S. sediforme *(S. altissimum)*	Europe	1′	blue-gray	2	1	Color excellent and growth neat
S. spathulifolium	W. U.S.A.	2″	white or green	2	2	A mat-former similar to *S. oreganum*
S. spurium	USSR	2″	green or red	2	1	Reddish plant forming a tight mat
S. stahlii	Mexico	6″	brown	2	1	An odd brown color, but interesting
S. treleasii	Mexico	1′	blue-green	2	2	Neat shrub with fat, sculptured leaves
Sempervivum arachnoideum ("Cobweb Plant")	Europe	2″	green, white	1	1	Tiny rosettes covered with cobweb-like hairs
S. tectorum	Europe	3″	green red	1	1	Larger, hairless rosettes
FICOIDACEAE						
Aptenia cordifolia	S. Africa	1′	green	2	2	Rank, but a good cover for sunny or shady areas
Carpobrotus edulis	S. Africa	1′	green	2	1	Only for large steep banks; crowds out small plants
Cephalophyllum alstonii	S. Africa	6″	green	2	2	Stunning, ruby-red flowers; plant closely
Cheiridopis candidissima	S. Africa	6″	white-gray	2	2	Whitish mats of finger-like leaves; yellow flowers
Cylindrophyllum tugwelliae	S. Africa	6″	gray-green	2	2	Good gray color, dense grower, yellowish flowers
Delosperma 'Alba'	S. Africa?	6″	green	2	1	Of uncertain identity and with poor flowers, but low-growing and very drought-resistant

Drosanthemum floribundum	S. Africa	2′	green	2	1	Pink flowers in great profusion
D. hispidum	S. Africa	2′	green	2	1	Purple flowers—almost overpoweringly brilliant
D. speciosum	S. Africa	2′	green	2	1	One of the best mesembs, with a burnt orange flower
Faucaria tigrina	S. Africa	3″	gray green	2	2	Fascinating plants with yellow flowers; plant closely
Glottiphyllum linguiforme	S. Africa	3″	green	2	2	Plant closely for green mat; snails love it
Lampranthus aurantiacus (*"L. aureus"* of the trade; *"L. aureus* 'Gold Nugget' ")	S. Africa	1′	gray-green	2	1	A clear, orange flower—outstanding
L. aurantiacus 'Glaucus' (*L. glaucus* of the trade)	Hort.	1′	gray-green	2	1	A form with yellow flowers; not true *L. glaucus*
L. aurantiacus 'Sunman'	Hort.	1′	gray-green	2	1	A form with golden flowers
L. filicaulis (*"Mesembryanthemum filifera"* of the trade)	S. Africa	4″	green	3	1	Low and dense, with small purplish flowers
L. glaucus	S. Africa	1′	gray	2	3	Small-leaved shrub with lemon-yellow flowers
L. productus	S. Africa	1′	gray-green	3	1	Lovely pink to purple flowers
L. spectabilis	S. Africa	1′	gray-green	3	2	One of the most colorful mesembs; purple flowers
Malephora crocea (*Hymenocyclus croceus*)	S. Africa	1′	gray-green	2	1	Flowers sparse, reddish yellow
M. crocea var. *purpureo-crocea* (*Hymenocyclus purpureo-croceus*)	S. Africa	1′	blue-green	2	1	Salmon-pink flowers are distinctive
M. luteola (*Hymenocyclus luteolus*)	S. Africa	1′	gray-green	3	1	A good mat with sparse, yellow flowers
Oscularia deltoides	S. Africa	1′	blue-green	2	2	Gracefully spreading plant, fragrant purple flowers

Name	Native of:	Ht.	Leaf color	Hardiness	Availability	Comments
LILIACEAE						
Aloe aristata	S. Africa	6″	green	2	2	Bristly, neat rosettes that look best in shade
A. brevifolia	S. Africa	1′	gray-green	2	2	Offsets profusely
A. ciliaris	S. Africa	4′	green	3	2	Forms dense, finely textured mass with red flowers
A. humilis	S. Africa	6″	gray-green	2	2	Shade-loving
A. nobilis	S. Africa	2′	green	2	2	Larger version of *A. brevifolia*
A. variegata	S. Africa	1′	green, white	2	2	Handsomely striped; needs shade, good drainage
Haworthia cuspidata	S. Africa	3″	green	2	2	Slow, but makes neat cushions; shade-lover
H. tessellata	S.W. Africa	3″	green	2	2	Rapidly suckering, looks best in shade
COMPOSITAE						
Othonna capensis (*O. crassifolia*)	S. Africa	3″	green	2	1	Valuable for mat-like growth and yellow flowers
Senecio hallianus	S. Africa	2″	blue	2	3	A new, rapid spreader
S. haworthii (*Kleinia tomentosa*)	S. Africa	2′	white	2	1	Valuable for its compact growth and white leaves
S. mandraliscae	S. Africa	1′	blue	2	1	The best of the blue succulents
S. radicans	S. Africa	3″	green	2	2	A mat of creeping stems and bead-like leaves
S. serpens (*Kleinia repens*)	S. Africa	1′	blue	2	2	Smaller version of *S. mandraliscae*
PORTULACACEAE						
Portulacaria afra	S. Africa	6′	green	2	1	Good as a dense background
P. afra 'Variegata'	Hort.	1′	pink-yellow	3	2	An excellent, low, variegated ground-cover

RECOMMENDED BOOKS

You will derive more pleasure from your plants if you read something of their way of life, their native habitats, and their cultural requirements. The following works (with approximate prices) are best for this purpose, but remember that all emphasize pot culture for indoor collections, rather than groundcovers for outdoor use. They do, however, give good descriptions and photos of some or all of the species we have mentioned.

Bertrand, A. *Succulent Plants Other Than Cacti.* Crosby Lockwood & Son, Ltd., London, 1959.
A small but well-illustrated guide.

Brown, J. R. *Succulents for the Amateur.* Abbey Garden Press, Pasadena, 1939 ($4).
Still one of the best, with profuse photos and informative text. It omits cacti.

Chidamian, Claude. *The Book of Cacti and Other Succulents.* Doubleday & Co., New York, 1958 ($4.50).
An excellent introduction to the subject, with a good account of outdoor planting.

Haage, Walther. *Cacti and Succulents.* E. P. Dutton & Co., New York, 1963 ($10).
The best introductory book on cacti and other succulents, though it deals only with indoor cultivation.

Higgins, Vera. *Crassulas in Cultivation.* Blandford Press, London, 1964 ($3).
A charming little book with fine drawings and color plates.

Higgins, Vera. *Succulents in Cultivation.* Blandford Press, London, 1960 ($3).
A beginner's book, dealing with cacti, and with good color plates.

Jacobsen, Hermann. *A Handbook of Succulent Plants.* Blandford Press, London, 1960 ($45).
A large, three-volume work, the modern classic on the subject, with all succulents (other than cacti) described and many pictured.

Van Laren, A. J. *Succulents Other Than Cacti.* Abbey San Encino Press, Los Angeles, 1934 (out of print).
A classic work, with many small color plates (reprinted in a still more reduced size in Brown's "Succulents for the Amateur"). Expensive in the English-language edition, it can often be obtained reasonably in the Dutch edition, containing the same illustrations.

———————. *Cactus and Succulent Journal.* Box 167, Reseda, Calif., 1929 . . . . . , bi-monthly ($5 yearly).
Contains articles on new or interesting succulents, accounts of collecting trips to foreign countries, nursery advertisements. Most of the books mentioned above may also be obtained through the Journal.

Iceplants as Groundcover

CARL ZANGGER

Probably iceplants are the most widely used groundcovers in Southern California. The wide selection of types, flower color and climatic adaptability makes them particularly well suited to planting in this region as well as other regions of similar climate. Upon examining the varieties available, the average person contemplating planting iceplants will find that they fall into three basic types: bush, trailing and climbing. Each type fills a particular need. Following are the three types, with the varieties available in the nursery trade, along with planting and cultural recommendations:

BUSHY ICEPLANTS —

The varieties falling into this general category are mainly of upright growth habit, though some are somewhat sprawling in their nature. Most will grow approximately 10 to 15 inches in height, with a very few attaining a height of 4 feet after a few seasons' growth. Nearly all the varieties in this category are benefitted by a light pruning back after the completion of their blooming cycle.

Pruning accomplishes two things: it eliminates the rather unsightly fruit which follow the blooms, and it encourages the plants to break forth with new growth which enhances their appearance through the rest of the year.

Most of this type are confined to planting in the coastal valleys of Southern California and in sheltered locations in the inland valleys. Most will tolerate conditions as far inland as San Bernardino and Riverside. Occasionally one will see a few hardy plants surviving in the Lancaster and Victorville areas, but they will be marginal in these regions even under the best conditions.

Lampranthus auranticus and its cultivars, 'Sunman' and 'Glaucus', grow approximately 10 to 15 inches in height and width. The blooming period is from late February into May with occasional flowers through summer. Planting should be about 12 to 18 inches apart. These varieties are best used for borders, low banks and for mass bedding, but are not recommended for steep banks. Colors range from bright orange to yellow. They will tolerate a few degrees of frost, but are generally not hardy in the upper desert valleys.

Lampranthus productus is a somewhat intermediate type of iceplant, not truly bushy in growth nor trailing, but more sprawling. It will reach a height of 15 inches and spread from 18 to 24 inches. An early winter bloomer, it is particularly appreciated because its bright purple blooms come in profusion in late January and continue into April and May, with appreciable quantities of flowers through the remainder of the year. Plant 12 to 18 inches apart. It is used as a ground cover on banks for mass bedding but is not hardy in the upper desert area.

SPREADING ICEPLANTS —

Cephalophyllum 'Red Spike', an unidentified species in general distribution throughout the Southland, is low and spreads by the addition of offshoots forming on the outer perimeter of the plants. Normally a single plant will slowly increase

to form a low clump 15 to 18 inches wide and 3 to 5 inches high. Spectacular flowers of brilliant cerise red are in great profusion during January, February and March with occasional bloom the rest of the year. This variety is popular for the effect of its bronzy red, finger-like foliage, as well as for its colorful bloom. Plantings will look better if taken up, divided and replanted every three to four years. Plant 6 to 12 inches apart. One of the hardier varieties of iceplant, it has been known to tolerate frosts down to 10 degrees and to survive in good condition. It will perform reasonably well in the upper desert valleys.

TRAILING ICEPLANTS —

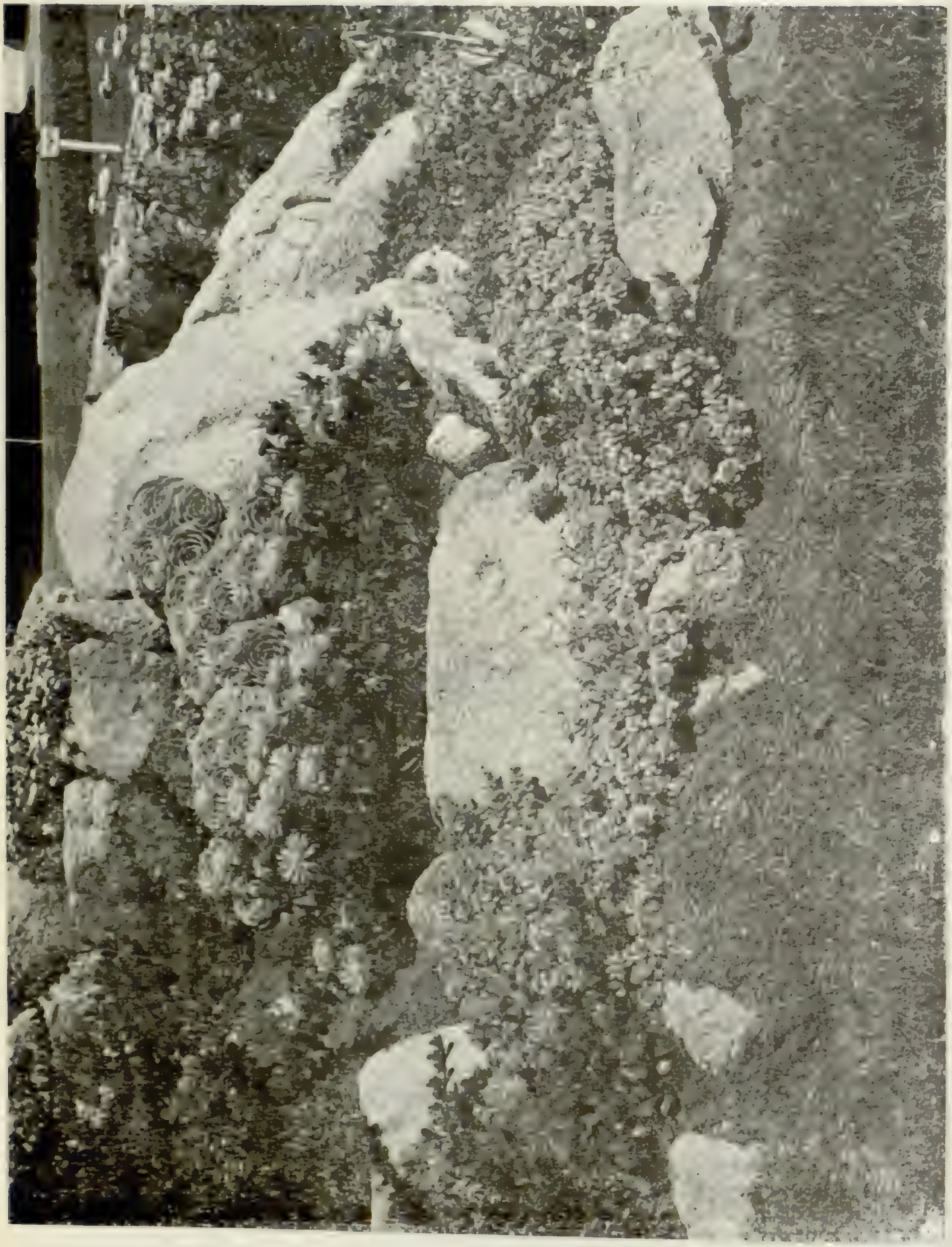
This category takes in the largest number of varieties of iceplants. They all benefit by a light pruning back after blooming, although this is not required, and frequently is not even possible or practical where large areas are planted on steep banks. Where pruning is not possible, feeding with a good general purpose plant food after blooming will encourage new growth that will quickly hide the old flower heads and seed pods. This treatment is also recommended for plantings that have been back.

Carpobrotus edulis (Fig marigold) is one of the more common species and is used predominately along our freeways and on banks in most of the coastal areas of California. Flowers are large, cream-colored and attractive, but not spectacular. This species is more utilitarian, serving to form a good groundcover under all types of soil conditions. Planting is generally done by cuttings placed every 18 to 24 inches apart. Cuttings take root and spread quickly. Its foliage will take up a tremendous amount of water and become very heavy. For this reason, it should not be planted on a steep bank with clay soil or on a hillside consisting of subsurface shale slanting in line with the contour of the hill which could result in a landslide after excessive irrigation or rainfall. This variety is hardy in coastal and inland valleys, but not in upper desert valleys.

Delosperma 'Alba' (white trailing iceplant) is a species of uncertain identity, excellent for planting on slopes. Plants or cuttings are normally set about 1 foot apart and grow quickly, forming an excellent cover. The small leaves grow very densely along the stems, resulting in an attractive green appearance at all seasons of the year. Attractive, but not spectacular, flowers are white and rather small, one-half inch in diameter. It grows well in most soil conditions and is recommended for planting in all coastal regions and inland to San Bernardino and Riverside. It is not hardy in upper desert regions.

Drosanthemum hispidum (Rosea iceplant) is one of the best kinds for planting on steep slopes. It persists and grows well even under the poorest of soil conditions. In fact, it has been observed draping itself down the sides of cement walls and channels. Planting is normally 12 to 18 inches apart. It spreads rapidly and roots along the stems as it spreads, making an excellent plant for preventing soil erosion. The mat-like foliage grows under 6 inches in height and is attractive at all seasons of the year. Flowers are spectacular in late spring and early summer, when they completely cover the foliage, making a spectacular blanket of lavender pink. It does well in coastal and foothill areas, but is not hardy in upper desert regions.

Malephora luteola (Yellow trailing iceplant) is a fine species for bedding and for planting on gentle slopes. The light green foliage is pleasing at all seasons. It



The use of rock can greatly enhance a succulent planting. Here, *Echeveria X imbricata*, *Sedum confusum* and several iceplants nestle comfortably in rock-crevices.

blooms later than most varieties of iceplant, presenting its best show in May and June, with some bloom throughout summer and fall. Plant 12 inches apart. It will take a few degrees of frost but is not recommended in colder regions. While this variety is classed as a trailing type it is really only semi-trailing or sprawling, and for this reason it is not recommended for planting on steep banks or slopes for erosion-control.

Malephora crocea var. *purpureo-crocea* (Crocea iceplant) is probably the hardiest of the iceplants and does well from the seashore as far inland as Lancaster and Victorville. Fine for erosion control, it is frequently planted along the freeways immediately adjacent to the roadway where it will tolerate the wind and fumes of the passing automobile traffic. Plant cuttings or plants 12 to 18 inches apart. Attractive grey-green foliage of medium size grows rapidly and the coppery-red or coppery-yellow flowers bloom most of the year, making their best showing in the springtime. It is hardy down to 10 degrees and will take short periods of even colder temperatures.

Lampranthus furnishes some of the most colorful iceplants. Their brilliant flowers open only in full sunlight.

Lampranthus filicaulis (Redondo creeper) has fine textured stems and foliage. It is rather slow in growth and creeps along the ground to form a thick carpet of wiry stems generally not over 3 inches in height. It is used mainly in areas where it can be appreciated close-up and is useful on mounds and low banks. Its flowers, blooming in early spring, are small and silvery pink. Not generally recommended for interior regions, it is excellent in coastal and intermediate valleys. Plant 6 to 12 inches apart.

Lampranthus spectabilis (trailing iceplant) is so outstanding in bloom that you are literally dazzled by the tremendous display of color in spring. Normally it will start to bloom in mid-March and will continue well into May, with occasional sporadic bloom in summer and fall. Although it is most often planted for its beautiful display of flowers, it does make an excellent groundcover as well. Foliage is small and plants spread rapidly to make a thick carpet of grey-green foliage, generally under 12 inches in height. Plant 12 to 18 inches apart. Plantings benefit by a light pruning after blooming to encourage new growth and to get rid of the old seed pods. It is best in coastal and intermediate valleys as far inland as San Bernardino but will not be hardy in upper-desert regions.

GENERAL CULTURE.

Watering:

Almost without exception, iceplants are benefitted with some summer watering. Since they are succulent and capable of withstanding periods of drought, it is often thought they are able to survive without supplemental water. In many instances this may be true, but the appearance of iceplant is greatly improved if they are watered at least once a month during the dry summer months. Species of *Lampranthus* and *Malephora luteola* should receive summer watering, but in judicious amounts. Over-watering will cause them to die out in patches. Most varieties of iceplants have been introduced to this country from South Africa. In their native habitat, they normally are dormant during the winter, which is our summer period. They have retained this characteristic in this area, making their slowest growth during our summer months, another reason why watering should be done but sparingly. Iceplants are capable of absorbing large amounts of water through their foliage, so it is not necessary to have great amounts of soil moisture present.

Diseases:

Very few pests or diseases bother the iceplants. Soil-borne diseases or root rots, such as water mold (Phytopthora) and Rhizoctonia are the most common problems. These diseases are controlled by use of some of the newer fungicides especially formulated for their control. However, good management is important. Keep the plants on the dry side during the summer months — July, August and September. As mentioned previously, they do look best if they receive supplemental watering, but don't overdo it. Soil-borne fungus diseases are more vicious and spread more rapidly under wet, humid conditions; keeping the plants on the dry side slows them down.

Fertilization:

Feeding with a good, complete-type plant food immediately after the blooming in Spring, and again in Fall about the time of our first rains, will be beneficial.

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THE COVER

Our cover photograph features one of the loveliest of the flowering trees to be found at the Los Angeles State and County Arboretum — the *Erythrina monosperma*. For an interesting flowering tree idea, see page 73.
(PHOTOGRAPH BY CHUCK KASSLER)

FROM THE PUBLISHER

As we bid goodbye to our retiring editor, Dr. Robert Atkinson, we reach another turning point in the history of LASCA LEAVES. *We offer him our sincere thanks for two years of faithful and capable editorship.*

Under Dr. Atkinson, topics such as orchids, the relationship between smog and plants, dichondra lawns and succulent ground-covers have been amply explored in the pages of LASCA LEAVES. *For this, we say "thanks for the work accomplished."*

We take this opportunity to welcome as our new editor Mr. Davis Dutton, a member of the staff of the Los Angeles State and County Arboretum. Mr. Dutton's past editorial experience, and his interest in the Arboretum well qualify him to take the helm of our Foundation publication and we look forward with great anticipation to the first issue under his leadership.

F. Harold Roach
President
California Arboretum Foundation, Inc.

ABOUT THE CONTRIBUTORS

Dr. William S. Stewart is Director of the Los Angeles County Department of Arboreta and Botanic Gardens . . . Mark Anthony is Superintendent of Descanso Gardens . . . for the past fifteen years Edward Pugh has been a member of the Arboretum staff . . . Plant Physiologist at the Arboretum, Dr. Robert Gonderman is a leading figure in fire-resistant plant research . . . Patrice Manahan is the Editor of WESTWAYS *and an active supporter of the conservation and beautification movement . . . Lydia S. Bowen holds the post of Librarian at the Arboretum . . . George H. Spalding is Superintendent of the Arboretum and a long-time contributor to* LASCA LEAVES.

Ecology, Research--and You

DR. WILLIAM S. STEWART

(Summary of an address before the California Garden Clubs, National Council of State Garden Clubs, Landscape Design Conference, on March 15, 1966, at the Los Angeles State and County Arboretum.)

What does the word *conservation* mean to you? Can you define *conservation?*

Pondering answers to these questions leads to a review of the many aspects of life that impinge on man and his survival, his competitors, his future, his children and his children's children. In the past, the layman probably has thought of conservation in terms of tangible, natural resources — forests, flora and fauna, soil and water. More recently, the additional intangible factor of "beauty" has come to the layman's attention as another important factor to be cherished and conserved.

In his Conservation Message to Congress in 1962, the late President John F. Kennedy spoke as follows: "Conservation . . . can be defined as the wise use of our natural environment: it is, in the final analysis, the highest form of national thrift — the prevention of waste and despoilment while preserving, improving and reviewing the quality and usefulness of all our resources."

It seems to me these considerations lead to the term *ecology* — a word much less well-known, but a term which is absolutely inseparable from conservation. Ecology — which refers to the sum total of all the actions, reactions, and interactions between an organism (in our case, man) and his environment—enters the definition of conservation under the terms "wise use" and "national thrift."

Ecology is recognized as a science, and as such requires systematized knowledge and measurement. It also involves research, for no branch of science possesses all of the knowledge necessary for its complete and final understanding. Ecology is no exception to this rule and, if anything, is in greater need of knowledge developed by research than many of the other biological sciences. Man is taking positive steps to obtain this ecological information, but it seems to come with agonizing slowness owing to the vast number of variables that impinge on the life of an organism, whether it be a nematode in the garden, a bird in the forest, or a man in the city.

Until significant ecological data is available, man must make the best judgments possible from information already developed by research, and from past and present experiences. With advances in electronic computers and other fields of knowledge, the possibilities of reaching valid conclusions in ecology are now more likely than they were several decades ago.

To my mind, the philosophy of conservation was admirably presented by Associate Professor of Forestry Emanuel Fritz, University of California, Berkeley,

in an address titled "Just What is Conservation?" and printed in the *Journal of Forestry*. As a preface to this article the editor commented as follows: "The author argues that conservation, to be meaningful, must be looked upon as wise use, frugality, and use without waste, and that it starts with the individual's *wise use* of his own resources—time, effort, and money. He believes that conservation is too frequently preached by those who are not guided by its basic principles in their own affairs and in the handling of public monies. He pleads for conservation teaching at its roots—frugality—to develop a race of citizens to whom all waste is abhorrent, and from whom a more frugal corps of public servants can be enlisted." Note, again, the term "wise use" in a definition of conservation.

Fire is an excellent illustration of the necessity of considering all of the environment in relation to man's ecology. In some localities of California, fire is used as a tool to burn the brush and chaparral and to increase the livestock carrying capacity of range land. In other places, particularly southern California, fire is disastrous for man and results in severe losses of homes, watersheds, and wildlife refuge areas. Man is seeking to practice conservation in the latter case by following the "Greenbelt Plan"—that is, by growing fire-resistant plants as protective barriers around homes. In the former case man practices conservation by "controlled burns." Each conservation practice has its place according to the total ecology.

In addition to fire control, man is grappling with the equally difficult problems of controlling pollution of air and water, which are as much our natural resources as forests and soil. One aspect of research being conducted here at the Arboretum to obtain the knowledge leading toward "wise use" of our environment is discussed in the article elsewhere in this issue by Dr. Robert Gonderman on "Fire Resistant Plants."

All of these problems result from man's existence in increasing numbers, and again emphasize our need for adequate basic knowledge to guide us toward satisfactory solutions—solutions which must be found if we are to live and thrive within our environment.

Statistics and statements are abundant that show man's waste of natural resources and that they portend severe consequences if continued into the future. Excellent reading along this line is found in:

Baker, Richard St. Barbe, Green Glory, The Forests of the World. *A. A. Wyss, Inc., N.Y. 1949. 253 pp.*

Dasmann, Raymond F., The Destruction of California. *Macmillan, 1965. 233 pp.*

Douglas, William O., A Wilderness Bill of Rights. *Little, Brown and Co., 1965. 181 pp.*

Stefferud, Alfred (editor), "A Place to Live." The Yearbook of Agriculture, *1963. United States Department of Agriculture. 584 pp.*
Udall, Stewart L., The Quiet Crisis. *Holt Rinehart, and Winston, 1963. 197 pp.*

Descanso Gets a Tea House

MARK ANTHONY

After years of planning and months of toil, something new—an Oriental Tea House and Japanese Garden—has been added at Descanso Gardens. On June 3, 1966, dedication ceremonies were held in which Mrs. Judge Smith, President of the Descanso Gardens Guild, presented the new Tea House and Garden to the County of Los Angeles. The dedication ceremony marked the fruition of a long and continuing effort by the Guild to finance and build this major addition to Descanso Gardens.

Design of the Tea House was by Whitney Smith, FAIA, of the firm of Smith & Williams of South Pasadena. The Tea House consists of a main building, roofed with bright-blue ceramic tile imported from Japan. Radiating from the main building are three satellite areas in which tea and cookies are served by hostesses dressed in native Japanese costume. Burnt ash tables and chairs are located throughout the satellite areas. The main structure and satellite areas will together accommodate about one hundred visitors.

Members of the Japanese-American community of Los Angeles County were enlisted in landscaping the surrounding area. Eijiro Nunokawa, Landscape Designer from Japan, was commissioned to design and execute the landscaping. With large native California oak trees overshadowing the area, and with a backdrop of *Ca-*

Main structure of the Tea House, seen from the west. Boulders encircling pool were carefully chosen from neighboring mountains

In the foreground, part of the garden and outdoor seating area; behind is the Tea House

A bridge spans the largest of the garden pools, leading visitors to the main seating area

mellia japonica on all sides, the garden landscaping was given a head start.

A rushing stream with large pools encircling the buildings was first constructed through the center of the garden. More than two hundred tons of specially selected stones from the mountains of southern California were artistically placed by Mr. Nunokawa and his crew around the stream and pools. Oak logs, simulating timber bamboo, were placed on end to outline many of the pool edges. A natural bridge was constructed to span the largest pool leading to the entrance of the Tea House. The colorful carp playing in the water were donated by friends of the Gardens. On the west side of the Tea House Mr. Nunokawa, with the help of his son and Ken Dyo of Pasadena, built a replica of a garden in Tokyo, Japan.

In selecting plants to adorn the surroundings, species native to Japan were used wherever possible. Azaleas of all kinds were planted in giant drifts. Sago palms were planted close to the building and giant bamboo, donated by the Los Angeles State and County Arboretum, was placed in the background. Cherry trees from Japan will provide a colorful spectacle in the spring.

Nandina domestica, Japanese black pine, *Aralia japonica,* red cut leaf maple, *Magnolia solangiana,* raphis palms, Australian and New Zealand tree ferns and sasanqua camellias round out the plantings. For ground cover, ajuga and monda grass have been employed. Eight stone lanterns and one pagoda are spaced throughout the garden to enhance the design.

The new Tea House and Japanese Garden has already become a focal point for visitors to Descanso Gardens; and the project stands as a triumph and a tribute to the dedicated efforts of the Descanso Gardens Guild, who made it possible.

A Pomegranate in History

EDWARD PUGH

Visitors to the Historical Preserve at the Los Angeles State and County Arboretum in Arcadia can visually turn the leaves of time.

Seventy years before Disneyland became a mecca for modern day tourists, a star attraction in southern California was "Lucky" Baldwin's Rancho Santa Anita, much of which is preserved today at the Arboretum. Few tourists during the period 1875 to 1900 would have missed an opportunity to stop at this California showplace, ballyhooed as "the largest, most productive and valuable ranch in the world!"

Visitors who came to the ranch entered what one nineteenth-century writer described as a "Dreamland," an enchanted landscape of trees, sparkling water and story-book buildings framed by glistening fruit orchards and golden wheat fields laced with mustard. Against this composition loomed the San Gabriel Mountains to the north and Santiago Peak of the Santa Anas to the southeast.

To Baldwin, "By God, this was paradise."

A devoted team of interested persons, including the Arboretum Historical Committee of the California Arboretum Foundation, Inc., have pushed time back. Today the mall garden at the Arboretum looks much as it did when Baldwin and friends played croquet near the adobe built by Hugo Reid, Baldwin's predecessor at Rancho Santa Anita. Once again the Queen Anne Cottage, the Coach Barn and the Hugo Reid adobe breathe the animated life of the nineteenth century. There have been changes, true. The network of canals is gone, the hoop-like Japanese bridges are no more, and the waterfalls are missing.

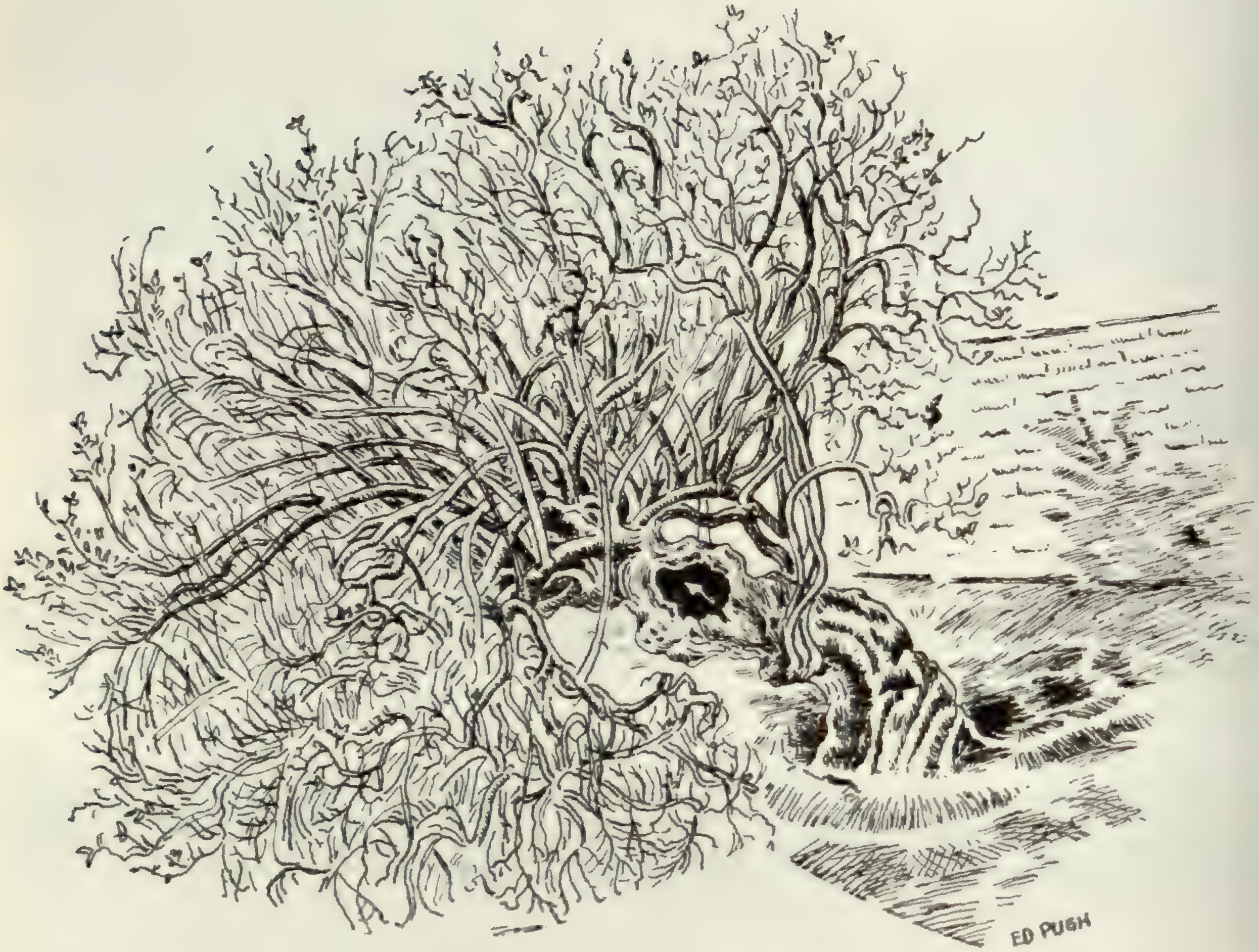
It is the *trees,* many of them the first of their kind planted in California, that remain to hold us to the romantic California past. If we study and ponder these plant antiques, we slide easily back into that comfortable period of *poco tiempo,* early California.

Through the years each of the ten owners of Rancho Santa Anita made tree contributions; many of these trees exist today, as if in living remembrance of the men who planted them. Trees range from 40 to 130 years old.

One of these trees is the gnarled pomegranate hugging the wall, southwest of the restored adobe recalls Hugo Reid (1810-1852) — first to privately own the Rancho Santa Anita, chronicler of Mexican California, and one of the molders of American California. The tree was set out as one of forty Granadas (pomegranates) in the original Reid fruit orchard.

There are other trees, too, that provide a link with the past. A date palm leaning out over the lake points towards a towering 180-foot blue-gum eucalyptus. Both blue-gum and date palm plantings are attributed to former mountain man William Wolfskill, owner of Rancho Santa Anita during the 1860s.

Other eucalypti, plus black walnuts, the English oak, Eastern persimmons,



". . . twenty-five strides away, persists a pomegranate that is well over one hundred years old; its trunk, knotted and twisted, argues its great age: this survivor of Don Hugo Reid's orchard remains a living bridge to our formative past"

elms and box elders are plantings made by "Lucky" Baldwin. The fine Ginkgo trees ringing the carriage house are also Baldwin introductions as are the horse chestnut trees near the cottage.

But the pomegranate is the proper beginning for our journey through the leaves of time. This shrub is pure beauty. Glossy green leaves — delicate pink buds and blazing scarlet flowers in spring—followed by splitting fruit—pregnant with seed in autumn. A plant to symbolize bountiful early California living.

The pomegranate came to California from Spain by way of Mexico. After Cortez conquered Mexico in 1521, the Jesuit padres soon began missionary work among the Indians. The padres brought the fruits of France and Spain, among which was the pomegranate. As missions in Mexico were established, fruits were carried north and planted in new mission gardens in California.

It is difficult to set an exact date for the arrival of the pomegranate in California. In the diaries and journals of many early explorers, travelers and missionaries to California we find mention of the pomegranate. Vancouver, in 1792, found an orchard at Mission San Buena Ventura in which pomegranates were growing along with apples, pears, plums, figs, oranges, grapes and peaches.

Father Palou in his *Life of Serra* (translated by Geiger) states that pomegranates were growing at Mission San Juan Capistrano in 1785. After carefully weighing the evidence at hand, Rev. Maynard Geiger, O.M., historian at Mission Santa Barbara, places the date the pomegranates came to California at 1776 or 1777.

The Spanish settlers in southern California had a fondness for the pomegranate. They made a dessert of fresh pomegranate seeds scooped from the rind and served with sugar. They also stored pomegranates for drying, and in winter broke a hole in the hard, withered rind of the fruit and sucked out the still-juicy seeds. In addition, pomegranates used as hedges and grown as shrubs or small trees were often a conspicuous planting in the Spanish-California patio.

Hugo Reid was the kind of man who would have been intrigued by the exotic pomegranate, wanting to include it among the many fruits set out in his orchard in the 1840s. It is probable that while he was exchanging seeds, cuttings, trees and vines with the padres from Mission San Gabriel that the pomegranate first made its way to Rancho Santa Anita. We know that forty pomegranates (out of 430 varieties of fruit trees) were included in an orchard inventory made in 1844 when Reid was considering the sale of his rancho.

Today, the history of the pomegranate in California is symbolized a few feet southwest of the Hugo Reid adobe at the Arboretum. Latest varieties, including the dwarf Nana, border the road. In sharp contrast, twenty-five strides away, persists a pomegranate that is well over one hundred years old; its trunk, knotted and twisted, argues its great age: this survivor of Don Hugo Reid's orchard remains a living bridge to our formative past.

Comments on Fire-resistant Plants

By Dr. Robert L. Gonderman

As residential sites in level areas become increasingly scarce, new construction moves to the chaparral-covered slopes and hillsides. These sites embody an increase in fire risk, especially from adjacent flammable vegetation.

In 1965 fire covered a staggering 2.5 million acres in the United States, and no small percentage of these fires took place in southern California where nearly a million persons live in the hillside areas.

When the risk of fire in these areas can be significantly reduced, everyone benefits. Residents enjoy greater contentment and security, as well as reduced insurance rates; the entire community is saved the enormous costs which must be borne in times of fire, erosion and flood.

Removal of highly flammable hillside vegetation is the method most readily employed by individual homeowners and housing groups, but this is only a partial solution to the problem of fire prevention.

Applied research at the Los Angeles State and County Arboretum has helped to guide the way to fire and erosion control by study of plants with less flammable characteristics—plants which may be substituted for existing vegetation. These can be employed in landscape planting to retard or suppress fires.

Under wildfire conditions, any known plant may be incinerated by the heat of flames if it stands alone. Groups of a given plant species generally exert a mass effect pertinent to their particular burning character. Low, sparse vegetation provides less fuel, producing smaller flames and less heat. Watered plants generally have a tendency to burn less rapidly than do plants that grow under drought conditions. Plants that resist burning do not carry flames and thereby, as a fire barrier or green-belt protection strip, keep the fires at a distance.

Although most organic substances, including green plants, will burn if they are subjected to temperatures high enough for a sustained period of time, a variation in burning characteristics is often noticeable. Some plants burn more slowly than others. A few of these are relatively non-flammable when compared with native southern California chaparral as typified by chamise-sage associations.

The concept of fire-resistance in plants arose when the former director of the Arboretum, Dr. Russell Seibert, and a forestry contingent were inspecting experimental erosion- and bank-control plantings along mountain roads. Some plants remained green and succulent amid the dry, brown, native chaparral. At that time, it was conjectured that green plants might burn more slowly and allow fire fighters more time in which to control incipient fires.

It has been reported that cellulose, one of the chief components of plant materials, burns by two competing processes: *flaming* and *glowing* combustion.

(Variation in the content and concentration of various cyclic and physiological development substances within the plant structure may have an influence on these processes.) Fire resistant plants tend to glow, char or ash, instead of bursting into flames.

For testing purposes, plant materials of wide scope are obtained, primarily from world-wide botanical garden seed lists and from the specimens on the grounds of the Los Angeles State and County Arboretum. In addition, plants are brought in from mountains and coastal areas, and from nearby botanical gardens such as Rancho Santa Ana Botanic Gardens and the Huntington Gardens.

Since visual appearance seems to bear little or no relationship to delayed combustibility, random sampling techniques are employed to find fire-resistant plant families. More intense testing is then concentrated within resistant families.

In the testing program, four types of screening tests are used: (1) Wooden matches, (2) Kiln-type electric-muffle furnace, (3) Dispersion head Bunsen burner or butane torch, and (4) Field trials with open flames from burning chaparral.

Fire officials look on as a plant-flammability test is conducted at Los Angeles State and County Arboretum

Open-flame tests are performed by "pushing" flames from burning chaparral into blocks of growing plants. The "push" is given by a 36-inch fan

Matches give only very gross preliminary clues.

The muffle furnace has given results in terms of replicated controlled conditions ranging from 600° to 900° C., which lead to quantitative data at a higher temperature plane than with matches.

Furnace measurements are recorded as (1) seconds to reaction, (2) intensity of reaction, and (3) reaction under ambient conditions when withdrawn from the furnace.

The intensity of reaction has been arbitrarily subdivided into five classifications: (1) will char or ash only, (2) will flame under heat, but not carry fire, (3) burns, (4) burns rapidly, (5) explodes into flames.

The important reaction sought among these species is the ability to resist flaming under elevated temperatures. Nearly a thousand species have been recorded in replicated tests following the above testing program. Many new plants are being continually processed for testing, and will be reported when sufficient valid data

are recorded and evaluated.

Open-flame tests lend themselves to an important class of data. In this test, 9′ x 9′ blocks of growing plants in the field are employed in an attempt to burn them. Chaparral is piled high against the blocks, treated with 3 ounces of kerosene and ignited, while a 36-inch fan generates a 30-MPH wind pusing the flame into the block of plants. The penetration of charred or ashed leaves within the block is measured as the criterion. These tests are conducted during the height of the fire season in the presence of interested officials and organizations.

Data on certain representative plants, reported as averages, are as follows:

Species	*Furnace Test*	*Open Flame Penetration*
Atriplex halimus	32-1-1	3′
Atriplex canescens	7-2-1	4′
Atriplex semibaccata	17-1-1	2′
Achillea tomentosa	27-1-1	1½′
Baccharis pilularis 'Dwarf'	17-1-1	2′
Cistus ladaniferus	12-3-1 (G)	3′
Cistus hybridus	10-3-1 (G)	2½′
Eriodictyon trichocalyx	14-3-1	7′
Isomeris arborea var. ovata	5-3-1 (G)	3½′
Psoralea bituminosa	18-2-1	4′
Santolina virens	27-1-1	1½′

(G) designates flames from confined heated gases.

Final testing is projected as an actual involvement in a major fire under wild-fire conditions.

All test plants are grown from seeds or cuttings, and their relative health and vigor is observed. These are then planted in a variety of field conditions for further ecological observations. To obtain results of these tests may require several years. Plants which are already established in the horticultural trade are given a minimum of ecological testing, and possibly none if commonly grown in this area. Plants which could possibly replace firebreaks have a high priority, but those suitable for residential landscape purposes are also being tested.

Around structures, fire-resistant plants can be used to replace hazardous chaparral for both erosion control and fire prevention. Placement of these plant materials in drifts or broad bands can act as a barrier to encroaching or spreading fires, much as we may use a firebreak of bare ground, so that adjacent forests, homes or other combustible structures and materials may be protected.

A Stand for Beauty

PATRICE MANAHAN

We Americans must be the champion landscape despoilers in the world, and Californians probably head the list. While there is no excuse for this state of affairs, there are reasons which may explain it.

The United States is the richest nation in the world. California is the Number One state in population and population growth, which is more important, and in automobile registration, personal income and effective buying income. We understand that only four nations in the free world surpass the California economy! So you might say we are in the midst of changes that are coming so fast we don't have time to pick up the pieces or to plan ahead.

Litter cleanup costs U.S. taxpayers $500 million annually—in cities, along highways, in recreation areas everywhere. Engaged in the war against litter is the national organization known as Keep America Beautiful, Inc., which is supported by various groups with a total membership of more than 70 million. Obviously, these people are not creating the problem. But more highways, more leisure time, more recreation areas and more money all provide more opportunities for the litterbug.

While litter is an important aspect of the uglification process now going on, it is by no means the only one. What has happened to the quiet hills that border the Ventura Freeway beween Woodland Hills and Conejo Pass has also happened to the Hollywood Hills and hundreds of other southern California pastoral scenes. The chaparral covered slopes have been sliced, the hollows filled to "create" land to be covered with houses all cut from the same pattern.

To take our minds off the major surgery that has been performed on the land there are signs, enormous signs, calling the attention of the passing motorist to the glorious facilities for gracious living that may be purchased in Shady Acres Haven or Casas Sobre las Olas for $35,000 and up with low down payments.

Though we sometimes become discouraged when battles are lost in the war against ugliness, there are heartening prospects. One of the most valiant of our warriors is a brave and energetic group known as Los Angeles Beautiful and captained by the legendary Valley Knudsen. For a good many years now L.A. Beautiful has been fighting courageously and persistently on at least a dozen fronts to preserve beauty, to create beauty where none exists and to eliminate the all-too-many eyesores.

At present Mrs. Knudsen and her cohorts are in the midst of a five-year plan to make California a carpet of living color to celebrate the 200th anniversary of the founding of the state, which will occur in 1969. First came the Year of the Tree, in 1965. To encourage Californians to do their individual part, Los Angeles Beautiful, in cooperation with the California Arboretum Foundation, Inc., and the Southern California Horticultural Institute published a handsome booklet, *Flowering Trees for Year-Round Color in Southern California.* It is illustrated in full color and presents a delightful list of flowering trees suitable for planting in this area. Now the same organizations have collaborated again on *Flowering Shrubs for Year-Round Color in Southern California,* to promote the Year of the Shrub, which is 1966.

Both publications may be purchased from the California Arboretum Foundation, Inc., 301 N. Baldwin Avenue, Arcadia and from Descanso Gardens, 1418 Descanso Drive, La Cañada, for $1.25 each including postage and tax.

The most expert help was called in to make the selection of these beautiful flowering trees and shrubs, many of which have been imported from Australia, South America and South Africa, where similar climates and growing conditions prevail. The greater part of southern California has what is known as a Mediterranean climate, which means that it is neither too hot, nor too cold, nor too wet. Many of the recommended selections are drouth resistant, suitable for planting either as street trees or as ornamentals in our gardens. And many, until now, have been comparatively rare, though wholesale nurseries are now stocking them and they can be found at the majority of retail establishments.

These little booklets contain not only beautiful photographs of the various trees and shrubs, they tell when they bloom, how tall they grow, where they should be planted, where they can be seen and what tempeatures they will withstand. And they will settle many an argument over proper names, because each tree or shrub is given its full botanical title.

Next year will be the Year of the Vine and 1968 will be the Year of the Ground Cover. If you missed out on observing the Year of the Tree, it's not too late to catch up, and there's still plenty of time to do your part on the other plantings.

When Portola and Serra trudged through the valley and over the hills from San Diego to Monterey in that long ago year of 1769, they found the Rose of Castile blooming along the way and wildflowers making patterns on the green hills. There isn't much left of their California, but with a little bit of luck, a good deal of self-control and some well-directed effort, we can make our land bloom again. For an astonishingly low price we can hide the ugly scars of our times under a carpet of living flowers.

Valley Knudsen told us that a delegation from Japan had visited her not long ago to get help in starting a similar program in Japan. They translated the material that Los Angeles Beauitful uses into Japanese, but they had one problem. There is no word in Japanese for litter, so they had to use the American term.

(Reprinted from WESTWAYS, *September 1966; © Automobile Club of So. California)*

What's in an Arboretum Library

By Lydia S. Bowen

One of the nine objectives put forth in 1948 by the California Arboretum Foundation Board, administrator for the newly founded Los Angeles State and County Arboretum, was library service.

A reference library for staff members only was the original intent in planning for a library, but since Arboretum objectives included both research and public information, it was soon apparent that the library must eventually become both a staff and a public resource.

The Arboretum library collection was started by gifts and purchases of the California Arboretum Foundation, Inc., together with contributions from individuals and societies. The temporary administration building of 1949 was the library's first home. Mrs. Janet Wright—herbalist, lecturer, and former assistant to the late William Hertrich, curator of the Huntington Botanical Gardens—undertook organization of the library for the Foundation. She ably adapted the Massachusetts Horticultural Society classification system as the basis for a card catalog which was put in use in 1952.

When the County of Los Angeles became administrator of the Arboretum in 1953, certain library needs were placed on the County budget, although the library continued to receive Foundation support. The following year Mrs. Russella C. McGah, former teacher and aide to husband, J. Thomas McGah, plant recorder, acted as part-time librarian. With the help of volunteers, Mrs. McGah pioneered expansion of the library, becoming full-time librarian in 1955.

In 1957, when the Arboretum library moved into temporary quarters in the new administration building and acquired a library assistant, patrons had begun to come from a wide area.

On June 8, 1959, the library again moved, this time to its present location in the administration-building complex, occupying one half of the upper floor, alongside the herbarium. The reading room was pleasantly fixtured in blond ash, and installed with effective fluorescent lighting. Many gifts — individual and organizational — continued to enhance the collection.

In 1960 provision was made for a part-time typist, and library service was extended to six days per week for public use. A 1963 gain was a thermofax reader-printer; a loss, indeed, was the retirement of Mrs. McGah.

Lydia Bowen became librarian in 1964. That same year nine cartons of duplicate items were sent to Balwant-Rajput College in India, location of Dr. William S. Stewart's Fulbright lectureship. The library still has a considerable collection of duplicates for disposition. This year, a library brochure—telling the aims, purposes and services of the library—was distributed to local librarians, educators and nurserymen.

The LASCA Library, although administered by Los Angeles County Public Library, is not a circulating branch, but a special self-ordering reference library, supported in part by the California Arboretum Foundation, Inc. It serves Descanso Gardens and South Coast Botanic Garden as well as LASCA. The public may consult the library at the Arboretum from 8 a.m. to 5 p.m., Mondays through Saturdays. Stacks are closed, but materials are readily available from the librarian in charge. Phone and letter inquiries are answered and bibliographies may be provided.

The library's present classification system is:

A	HORTICULTURE
B	CULTURE OF INDIVIDUAL ORNAMENTALS
C	FOOD PLANTS — Culture
D	AGRICULTURE (limited)
E	FORESTRY (limited)
F	LANDSCAPE ARCHITECTURE
G	BOTANY — General, Economic
H	BOTANY — Geographical
L	AUXILIARY SCIENCES
N	GENERAL SCIENCES
P	SOCIAL SCIENCES
R	LITERATURE
S	FINE ARTS
T	BIOGRAPHY
V	TRAVEL
X	GENERAL REFERENCE
Z	PERIODICALS

The card catalog is supplemented by many subject bibliographies, and by the Gray Herbarium Card Index.

A standing book committee consisting of the chief of the Arboretum's Education Division, the herbarium curator, the librarian and other staff members functions in reference selection, aided by a large collection of book catalogs—new, used, domestic and foreign. Changing book displays in the reading room and the rotunda bring current holdings to public view. Membership in the Special Libraries Association acquaints the LASCA library, through journals and professional meetings, with special libraries' activities of our district.

The library participated in the Arcadia Public Library's annual meeting for

National Library Week planning, and in the Southern California Council on Californiana and Local History collaboration sponsored by the Pomona Public Library. The staff of the library currently consists of Lydia S. Bowen, librarian; Hazel B. Rodgers, library assistant; and Ruth Taylor, typist clerk.

Current holdings of approximately 15,500 cataloged items and 13,000 uncataloged items stem both from demands of professional and amateur users, and from gifts of donors. In the past year, about 800 cataloged items were added. The variety in our "botanical and horticultural" library is wide. Local history includes the Indian, Hugo Reid and Baldwin tradition; and natural history includes a good

many ornithological texts (for Arboretum bird watchers). Lavishly illustrated antiquarian volumes, such as Dodoens 1578 *Niewe herball*, are also in the collection.

Staff research demands strong holdings in scholarly periodicals, both domestic and foreign. Over a third of our shelves are occupied by serials ranging from scholarly to popular and representing twelve languages. Currently, 340 periodicals are received. Pamphlets are also an important component of the collection.

Current Arboretum projects in fire-resistant plants, camellia breeding and smog effects on plants require special source materials. Instructors of the adult and youth horticultural classes need texts; tour guides seek lore and information covering their guided public tours.

Public patrons, amateur and professional, break ground with the "big five" along the reading room wall — Bailey's *Cyclopedia,* Sunset's *Western Garden Book, Standardized Plant Names, Exotica,* and the Munz volumes on California native plants.

Gardeners want to know — where can I buy this newly publicized plant? How can I learn more about the culture of my hedge? Where can I join a rose society? Organizations ask — what street tree is suitable for our windy, high-desert town? What inspirational books on garden themes are available?

Teachers and professors from elementary level through university graduate schools look for classroom and report materials. Classes often visit the library for short orientation talks. Students may ask — what effects has radiation on plants? What is Argentina's national flower, and where may it be seen? Parents inquire about summer camp conservation programs and poisonous plants.

Institutional researchers and amateur hybridizers supplement their literature here. Writers seeking authentic natural history backgrounds study world-wide floras; collectors planning foreign trips consult plant exploration books. TV and movie producers request floral art details. The library has good and growing materials on native California plants. Clippings, pictures and scrapbooks supplement other holdings.

Loan collections housed in LASCA Library include materials from the California Institute of Technology, UCLA, California Garden Clubs, the Cactus and Succulent Society, the Begonia Society and the International Geranium Society.

Widening use of the library can be anticipated in years to come. Staff and public interest will continue to be served through up-dating and balancing the collection, and by augmenting bibliographies. Generous administrators, friends and donors (Donations are needed and welcomed) have made us happily aware that libraries. like Kipling's gardens, "are not made by saying 'oh, how beautiful' and sitting in the shade."

A Suggestion for Holiday Giving

Flowering Trees and *Flowering Shrubs for Year-Round Color in Southern California* are ideal for attractive and unusual Christmas cards or gifts.

Quantity discounts are available now by calling or writing the California Arboretum Foundation office, 301 North Baldwin Avenue, Arcadia (phone: 447-8207).

Imprinting is available on orders placed before November 15, 1966.

Growing Notes

GEORGE H. SPALDING

This is the beginning of the second series of Growing Notes. There are two major reasons for this. The first is that, with this issue, *Lasca Leaves* once again becomes the 'house organ' for the Arboretum and California Arboretum Foundation. The second, and perhaps most important reason, is that the author has reached that age where the phrase "when I get the time" must be changed to "I'll take the time" if one is to enjoy even a few of the more pleasurable things in life, and writing Growing Notes is pure pleasure.

Developing the material for these Notes naturally included a review of the first series, which provided a perfect take-off point. So many years have passed that many of the early Growing Notes should be brought up-to-date. As we go through them it will be interesting to note where original evaluations have been justified, and where early enthusiasm furnished rose colored glasses for viewing the plants.

In Vol. I No. 2 mention was made of the fine specimen of *Acacia elata* at the northeast corner of Lombardy Road and Allen Avenue in Pasadena. Old age has set in and this tree will be only a memory in the next few years. At the present time it no longer resembles the tree of even five or six years ago.

Dodonaea viscosa purpurea was given a fine send off in Vol. III, No. 1. The enthusiasm of thirteen years ago, however, has now been tempered by many years of experience. While we still consider it a fine plant, some limitations have appeared which should be taken into consideration when using it. Where several plants are used in a group, a few stand-by plants should be maintained to replace any of the original planting which may die out. *Dodonaea* appears to be susceptible to one or more of the water molds which cause a gradual die-back of branches in various parts of the plant even though the real trouble is at the roots. Even when free from this problem, *Dodonaea* appears now to be a rather short-lived plant with a life expectancy of about ten years. It will be interesting to watch the plants when used as street trees. Growing them in this form will perhaps increase their life span. This does not mean that individual plants cannot live longer (or die sooner). In general, however, *Dodonaea viscosa purpurea* should not be considered as a long-lived subject.

Acacia vestita, now fifteen years old, is still a vigorous plant although the Arboretum's original specimen is now badly crowded by other plants. As with most Acacias, plans should call for replacement every fifteen to twenty years. *Acacia vestita* may prove to be longer lived than most; the specimen here is still vigorous and attractive. A new planting has been made in the Arboretum's Australian section, and this will be watched with great interest.

Acacia steedmani (Vol. III, No. 2) has passed out of the picture and been replaced. It is still one of our favorites as it blooms the second year from seed and is a quick-growing, colorful filler plant which continues to give color for at least 8 to 10 years. It has the additional virtue of purple-tinted new growth which is most attractive.

Verbena peruviana (Vol. IV, No. 1) has become one of the most widely planted ground-covers in southern California. The original bright red form is not as popular as the softer pink and lavender forms now being sold by nurseries.

It is very probable that it all started from three plants which were grown from seed at the Arboretum in 1951. Some propagations were given to the Evans & Reeves Nursery (now gone) who propagated and introduced it. Color forms began to show up within a very few years, and there is the possibility that it has hybridized with other species as well. These new forms appear to be somewhat more tolerant of water than the species, and so more adaptable to home grounds where we all water too much. However, for that hard-to-water corner or low maintenance areas, *Verbena peruviana* is still the best.

Acacia cardiophylla

Dodonaea viscosa purpurea

Acacia cardiophylla (Vol. IV, No. 2) is still at the top of the list of low-maintenance, drought-resistant shrubs. Our original plants have reached maturity, and some will shortly have to be removed. Nevertheless, they have given fifteen years of fine service as an evergreen hedge with a minimum of care. At maturity they are about six to seven feet tall, of rounded form with a spread of six to eight feet. A three-year old planting along the Arboretum's fence line at Hugo Reid Drive and Baldwin Avenue has required watering only every six weeks or so during the summer. (after the first year). New plantings of seed are made periodically so that we will always have plants to use. *Acacia cardiophylla* is another still highly recommended.

So much for past Notes for this time. We hope every issue of the new series will contain at least a brief note on something new. For this issue our "Something new" will be Tabebuias.

For many years it was generally believed that Tabebuias as a group were not reliably hardy in southern California. Hobbyists had tried them with varying degrees of success but they were definitely not what could be called a general nursery item.

Some years ago in a discussion with Dr. Russell J. Seibert, (Director of the Arboretum from 1950 to 1955), he mentioned that it might be useful to obtain some of the Tabebuia species native to South America. Reliable seed sources in that part of the world are few, but we finally had success when Dr. and Mrs. Samuel Ayres, Jr. went into the area on a vacation trip. Dr. Ayres obtained seed of several species of Tabebuia which are now being grown at the Arboretum.

We now know that there are two groups of Tabebuias, one native to the Carribean and Central America, the other native to southern Brazil, Paraguay, and Argentina. It appears that the Carribean group are all too tender for southern California but that the South American group may well provide exceptionally beautiful additions to our list of small flowering trees. One *Tabebuia chrysotricha* has been introduced by the Arboretum and is available in nurseries.

Payne Foundation Schedules Native Plant Lectures

The Theodore Payne Foundation has announced its 1966-67 series of six Native Plant Lectures. The lectures, free of charge and open to the public, will be held at the Arboretum, 301 North Baldwin Avenue, Arcadia; and at Descanso Gardens, 1418 Descanso Drive, La Canada.

Lectures to take place at the Arboretum include "Native California Flora and Its Conservation" by Dr. Mildred Mathias, October 21, 1966; "Your Forests" by William T. Dresser, January 27, 1967; and "California Wild Flowers" by Dr. Philip A. Munz, March 24, 1967. Descanso programs include "California Wild Flowers for Your Gardens" by Mildred Finch Brown, November 16, 1966; "Identification of California Native Plants" by Dr. Robert F. Thorne, February 15, 1967; and an illustrated wild flower lecture by Mr. and Mrs. Roy H. Raymond, April 12, 1967. Each of the lectures begins at 8 p.m.

An Invitation to Foundation Members

An official hostess group is being organized for the Arboretum Historical Area. If you would like to devote some time studying and working in this project, which begins in January, you are invited to apply for membership.

NAME_____

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Send to: California Arboretum Foundation, Inc.

301 North Baldwin Avenue, Arcadia, California 91006

Dr. Martin Takes New Post

Dr. Louis B. Martin, Chief of the Education Division at the Los Angeles State and County Arboretum and former editor of LASCA LEAVES, has resigned his post to accept the position of Director of the Denver Botanic Gardens, Denver, Colorado.

Dr. Martin came to the Arboretum in 1953 as Plant Pathologist. In 1961 he was given the post of Chief of the Education Division. In this capacity, Dr. Martin was responsible for the numerous educational and informational services at the Los Angeles State and County Arboretum in Arcadia, Descanso Gardens in La Canada and the South Coast Botanic Garden in the Palo Verdes Peninsula.

A resident of California since 1946, Dr. Martin was born in Chicago, Illinois, and did his high school and junior college work in that state. During 1940 and 1941 he was associated with the Morton Arboretum, Lisle, Illinois. He served with the U. S. Army Signal Corps from 1942 to 1946.

Following World War II, Dr. Martin did undergraduate and graduate work in botany at the University of California, Los Angeles, receiving his B.S. in 1948 and his Ph.D. in 1954. While serving at the Arboretum, he made his home in Arcadia with his wife, Betty, and two children.

Dr. Martin is chairman of the educational committees of the American Association of Botanical Gardens and Arboretums and the American Horticultural Society. It was largely through his efforts that a proposal was prepared for a National Regional Gardener School. This proposal is currently under consideration by the United States Department of Labor.

For six years, from 1956 to 1963, Dr. Martin was editor of LASCA LEAVES. He wrote and produced a series of radio shows on horticulture and gardening, and is the author of numerous articles on turfgrass culture, fire-resistant plants and horticultural education. It was under his direction that the Arboretum's Professional Gardener School was founded.

In his new capacity, Dr. Martin will have charge of the only botanical garden in the Great Plains-Rock Mountain area of the United States. The Denver Botanic Gardens consist of two sites, both within the city limits of Denver.

The larger, 100-acre site includes a collection of conifers, a large planting of cultivated forms of junipers, an iris garden containing more than 1,000 plants and a rose garden consisting of 3,500 bushes.

The smaller portion of the Denver Botanic Gardens contain the administration buildings, library, herbarium, children's garden, herb garden and a large conservatory. Within this conservatory, dedicated only last January, more than one-quarter acre of land is devoted to tropical and sub-tropical plantings.

The members of the California Arboretum Foundation, Inc., together with the staff and friends of the Arboretum, send Dr. Lou Martin their best wishes.

In Memoriam

The Board of Trustees and members of the Foundation regret deeply the loss of four outstanding members who have passed away in recent months.

William Hertrich, nationally known horticulturist, was one of the group of civic-minded citizen who helped to organize and establish the Arboretum and the California Arboretum Foundation. Mr. Hertrich served on the Board of Trustees from its inception, and for the past few years had been an Honorary Trustee when his health would not permit him to participate as actively as he had for so many years. He was instrumental in developing the famous botanical gardens at the Huntington Library and was Curator Emeritus there. During his lifetime he received national and international honors for his achievements in many areas of horticultural endeavor. His kindly manner will be long remembered; his beliefs and principles have become an integral part of our Arboretum as it exists today.

John C. Macfarland will long be remembered for his work in the early development of the historical section of the Arboretum. He served on the Historical Committee of the California Arboretum Foundation and worked diligently and faithfully with this Committee to restore and preserve the Queen Anne Cottage, the Hugo Reid Adobe and Coach Barn. In formulation of policy and other difficult matters, the Foundation received the benefit of his invaluable legal knowledge and advice. He gave generously of his time, and was unsparing in his efforts during the many years he was a member of the Board of Trustees.

Maurice Block directed restoration of the Queen Anne Cottage at the Arboretum and later was consultant for the Historical Center. The beauty and authenticity of our historical section is due in large measure to Mr. Block's guiding hand. Although for the past few years Mr. Block had found it difficult to visit the Arboretum, he continued to retain his interest and support whenever called upon for advice and counsel.

The fourth irreplaceable member of our Historical Committee to pass away recently is *Lindley Bynum* who served as Co-Secretary, with W. W. Robinson, during the pioneer, planning years. He contributed in many ways to the development of the Arboretum's Historical Center. Most entertaining was his minute-keeping during our meetings, mostly out-of-doors and chorused by ducks and geese, near the Hugo Reid Adobe.

Lindley Bynum was born in Los Angeles in 1895. He died in Berkeley on September 20, 1965. During his thirteen years with the Huntington Library, and many more as roving Special Assistant to Dr. Sproul, President of the University of California, he garnered an untold number of literary treasures from generous Californians for these world-renowned institutions.

Quoting a sorrowing, Stanford classmate: "Not every respected scholar is a sought-after speaker and lecturer. 'Pinky' Bynum was. The results of his searches were presented to happy audiences charmed by the quiet voice, the casual manner, the quizzical eyebrows, the dry wit."

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THE COVER

The cover painting for this issue is the work of Gerry V. Patten, an accomplished draughtsman and watercolorist who very recently retired as Staff Artist at the Arboretum. For the past decade Gerry Patten has been a frequent contributor to LASCA LEAVES. He now plans to devote most of his time to painting and teaching. The scene on the cover depicts the Arboretum's Australian section, with the San Gabriel Mountains in the background.
(Correction note: the tree which appeared on the cover of the Summer 1966 issue should have been identified as *Erythrina crista-galli.*)

IN MEMORIAM: SUSANNA BRYANT DAKIN

To those of us who knew her, and even to those for whom she was only a name in the world of good works, the news of the sudden death of Mrs. Susanna Dakin of San Francisco came as a most tragic blow. For the Arboretum and the California Arboretum Foundation, her passing leaves a void which can never be restored.

Susanna Bryant Dakin was one of the prime movers in the drive to preserve the historic Lucky Baldwin estate and to develop it as an Arboretum. She was a founding member of the Foundation's Historical Committee nearly twenty years ago, and her interest in the rehabilitation and maintenance of the Historical Area never waned, as demonstrated by her recent gift of an 1885 drawing of the Rancho to the Arboretum Library.

While her interests and concerns were wide, extending into many fields, one felt as though the Arboretum was ever in her thoughts. We have lost a great patron of the arts, a respected historian, and a great humanitarian.

In a future issue of LASCA LEAVES *we will publish a lengthier tribute to this dedicated and remarkable woman who did so much for the Arboretum. In the meantime, the following article — Mrs. Dakin's fine memoir of the late Maurice Block, penned only a few weeks before her death—stands as a tribute to her generosity of spirit.*

F. HAROLD ROACH
President
California Arboretum Foundation, Inc.

Maurice Block

By Susanna Bryant Dakin

In 1951, Maurice Block forecast the present appearance of the so-called "Queen Anne Cottage" and the Baldwin "Coach Barn" at the Los Angeles State and County Arboretum. These buildings were then in a deteriorated condition — empty, vandalized, in need of paint and riddled by termites, the "cottage" tower about to collapse. In Block's own words, recorded by W. W. Robinson, as Secretary of the now-disbanded planning and fund-raising Historical Committee:

"The restoration of the 'Lucky' Baldwin Casino seems to me to consist mainly of repairs and replacements, from top to bottom, of structural and ornamental details indicated by the original plan and by the nature of the place — no new building. The approach to the cottage and its immediate surroundings of garden or lawn should be designed in harmony as an aid in giving the place character and atmosphere.

"Intended exclusively for entertainment, the cottage would have been rather elaborately and colorfully furnished. I think the Victorian tendency towards heaviness should not be emphasized, that the project should be carried through with a touch of fantasy, more like a stage set than a house to be lived in. In other words, the medium for painting the picture should be water color rather than oil. There should be a certain gaiety about it, although not to the extent of cheapening it or making it a caricature. It should have an atmosphere of expectancy — as if living creatures might appear in it at any moment.

"In the stable, besides structural restoration, the effort should be largely re-creation of the original setting with such indications as can be given of the bustle of life that once went on there, like arrested pageantry."

Maurice Block succeeded, even beyond expectation, in completing the complex and necessarily expensive work of architectural and landscape restoration, planning and choosing the Victorian furnishings by Mark Twain's edict — "The best is none too good for Baldwin" (a remark made by the humorist while observing "Lucky" buy a wonderful Swiss clock at the 1876 Centennial Exposition in Philadelphia). A nationally known museum director, visiting the restored "cottage" a few years later, said of his confrere — "He has captured the very perfume of the Past."

Since the original furnishings had long since vanished, only a few Baldwin

Photo by Huntington Library

Maurice Block

possessions could be acquired by gift or purchase. Many heirlooms from other families, found and arranged by the Supervisor of Restorations, contribute to an atmosphere that is the essence of Victorianism. The original detail and colors were established by consulting many sources, none more reliable than an old German carpenter named Frank Moors who had worked at Rancho Santa Anita in 1880-81, under the supervision of Mr. Baldwin's architect, A. A. Bennett. Moors, then in his nineties, remembered the day when carpeting came from San Francisco and the long, gilt mirrors were installed.

A large oil landscape, painted by H. H. Cross in 1889, testifies to the authenticity of the restoration. In the foreground stands a bearded "Lucky" in fashionable attire, even to grey kid gloves, surrounded by mastiffs, in company with a young girl wearing a short, black-bustled dress. This is his daughter Anita, whose mother was Jennie Dexter Baldwin. Across the lake, left background, is the fanciful red and white "Queen Anne Cottage" looking spruce as it does today, thanks to the efforts of Maurice Block.

A stern sense of excellence, a soaring imagination, and unremitting attention to detail — this rare combination of qualities characterized Maurice Block both in his professional and private life.

Maurice Block was born in 1887 in Galion, Ohio, where his grandfather had been the architect responsible for many mansard-roofed buildings still standing. A sister, Mrs. A. W. Bradfield, lives in Galion today; and it was the childhood home of his dearly-loved niece, now Mrs. Theodore Dixon of Simsbury, Connecticut, who came to Pasadena last summer to settle his affairs and distribute the thoughtful bequests that Maurice made to his friends. He died on July first, 1966 — unbelievably, almost eighty years old. In appearance, he changed very little during the years that we knew him here at the Arboretum.

In the earlier years of a distinguished, "Who's Who" career, Maurice Block was for seven years assistant curator of decorative arts at the Art Institute of Chicago, and for four years on its teaching staff. He did postgraduate work in Europe and New York, and for six years was director of the Omaha Art Institute.

In 1928 Mr. Block because first curator of the art collections at the Henry E. Huntington Library and Art Gallery in San Marino. His activities in almost a quarter century there included authorship of definitive works on Francois Boucher and the Beauvais Tapestries, besides the preparation of handbooks of the art collections and illuminating notes on exhibitions through the years. His name is associated with two major developments in the Huntington Art Gallery — the planning, decoration and final arrangement of the large gallery where the "Blue Boy", "Pinkie", and other famous pictures hang; and installation of the Georgian Room, including subtle and beautiful indirect lighting of his own design.

His own home, at 625 Westgate Street in Pasadena, was an intimate museum — the setting for a carefully chosen collection of art objects from all over the world. After "retirement" from the Huntington Mr. Block went to work for fifteen years in the LASCA Historical Center.

In appreciation, a memorial fund is being established — for future purchases

and unanticipated services to insure (against evaporation) that the "very perfume of the Past" continues to emanate from the Arboretum's Victorian buildings. Checks may be made out to the California Arboretum Foundation, Inc. Such memorial gifts, of course, are tax-exempt. They will be dispersed as carefully as if our Supervisor of Restorations were still with us. His stern sense of excellence remains an inspiration to all who were privileged to work with him, on the historic and beautiful Rancho Santa Anita.

Book Review

The Concise Handbook of Roses, by Eigil Kiaer and others, with illustrations by Verner Hancke; 111 pp.; E. P. Dutton & Co., New York, N.Y.; $5.95.

This useful and readable volume, edited and primarily written by Eigil Kiaer, a Danish landscape architect, combines practical horticultural information with a fascinating discussion of the venerable history of the rose—the place this universally admired flower has assumed in the religion, art, literature and folklore of man. As an added dividend *The Concise Handbook of Roses* also contains 64 pages of full-color illustrations, beautifully rendered by Verner Hancke.

The grower of roses, particularly the novice grower, should find the section on 'Rose Cultivation' especially helpful. Soils, tools, foods, diseases and pests, pruning and planting are among the many topics covered.

Equally interesting are the chapters dealing with the rose's 5,000-year history. Each of the color plates is identified and described in some detail, including year and area of origin, together with cultural history. The commendable English translation is by Dr. Gwynne Vevers.

A Report on the Effect of Shade Trees On 'Smog'

W. S. STEWART and D. H. WILKEN

It is generally recognized that in the Los Angeles basin area the air pollutant known as 'smog' results from an involved series of photo-chemical reactions between ozone, peroxides, nitrogen oxides, and oxidized hydrocarbons from various sources including auto exhaust, catalysed by sunlight. An end product is a group of compounds known as peroxyacetyl nitrates (abbreviated 'PANS'). These are considered to be major contributors to eye-irritation and have been shown to cause considerable damage to vegetation. Since no information was available, however, showing the influence of plants on smog itself, gross measurements were undertaken at the Los Angeles State and County Arboretum to determine this effect.

Using recognized methods for 'smog' analysis, air samples were taken simultaneous from two feet above, and below, the leaf canopy of the shade tree *Albizzia julibrissen*. Likewise, samples were taken six inches above and below the foliage canopy of the vine Bougainvillea 'Orange King'.

The smog analyses showed that the air sample from below the foliage canopy in the shade contained significantly less oxidant (smog) than did the air sample from the sunlight above the canopy. According to the degree of air movement, the reduction of smog in the shade varied from nearly complete elimination to no difference whatsoever when there was a strong breeze. These findings suggested that the observed smog reduction due to shade trees and vines was due to the shade from their leaves.

To answer this question trials were made using shade from opaque objects such as cardboard and aluminum foil. The resulting data showed clearly that the observed reduction in smog under shade trees could be accounted for as a result of the exclusion of direct sunlight.

From these findings it is suggested that some of the undesirable effects of smog

in a localized area such as a garden, or in landscaping around homes and buildings, may be reduced by:

(1) The planting of shade trees, vines and shrubs, and by encouraging a denser growth of vegetation; or by

(2) The production of shade by planting and building shaded patios, trellises, pergolas and similar structures.

The concept of shading by plants to reduce indirectly the smog level might also be applied to parking lots, street trees, parks, recreation areas, and other civic plantings. In addition, these plantings would result in beautification and provide a more aesthetically pleasing environment, while at the same time creating a local situation in which the smog concentration would be somewhat abated.

(This investigation was supported by Public Health Service Research Grant No. AP 00132-08 from the Division of Air Pollution, U.S. Department of Health, Education, and Welfare. Technical details will be published elsewhere.)

Historic Eucalyptus

EDWARD PUGH

One of the first eucalyptus trees planted in southern California grows beside the Queen Anne Cottage on the grounds of the Los Angeles State and County Arboretum. A magnificent twin-trunk giant, this eucalyptus represents the tallest tree on the Arboretum grounds — a soaring 180 feet high with a trunk diameter of nearly 10 feet. The age of this eucalyptus — this "mother blue gum" — is, according to the best estimate, 103 years.

The eucalyptus probably first came to California in the 1850's. It is not definitely known who introduced the first trees, but not long after the Gold Rush a Californian by the name of Dr. H. H. Behr had begun to talk about the importation of eucalyptus trees from Australia. It is even possible that Dr. Behr may have sent seed to California.

By 1853, at any rate, fourteen species of eucalyptus were recorded growing in the garden and nursery of Mr. W. C. Walker of San Francisco, and in 1856 the pioneer Shellmound Nursery of Oakland was selling eucalyptus seedlings for five dollars apiece.

The eucalyptus — the blue gum — arrived in northern California in 1863. A Californian, Bishop William H. Taylor of the Methodist church in Australia sent a quantity of blue gum seeds to his wife's home in Alameda. She planted them in her own greenhouse in San Francisco and Alameda, where they prospered. She and a friend, James T. Stratton, gave away and sold much seed and thousands of plants. The Federal Government took notice and imported more seed, sending it to southern California where it was distributed to ranchos such as those owned by the Verdugo and the Workman families.

It is believed that William Wolfskill, early owner of Rancho Santa Anita, acquired some of the seedlings from the Taylors in either 1863 or 1865. Wolfskill is credited with the planting of about a dozen trees. Harris Newmark (next owner of Rancho Santa Anita) left records that there were five blue gums growing near the rancho's Hugo Reid adobe in 1872-73 and that they had been planted by William Wolfskill. He further speculated that the other trees had no doubt been cut down or had died by that date. Further substantiating evidence is a photograph taken in the 1880's showing the Wolfskill tree in its present location of a size which would indicate its having been planted in the mid-1860's.

Indeed, the century-old Wolfskill eucalyptus could well be called a parent to the hundreds of blue gum eucalyptus trees planted by E. J. "Lucky" Baldwin on the Rancho Santa Anita, and to the thousands subsequently planted throughout southern California. It is appropriate that today at the Arboretum we display one of the largest eucalyptus collections outside Australia.

Is That a Dirty Tree?

By Samuel Ayres, Jr., M.D.

"You will love Hawaii," said John Nicholls to his table companions on the Lurline. "The thing that impressed me most when we were there twenty years ago was the riot of color in the flowering trees."

"Of course, we can't grow anything like that in Chicago," added his wife, Lois. "We live in an apartment, but John has a window box garden on our balcony. We have a dwarf oleander tree, but we have to bring it inside during the winter."

"The royal poincianas and the shower trees were out of this world," continued John. "I was particularly impressed with the Golden Shower trees."

"Is it a dirty tree?" inquired Edna Wilson, sitting across from him.

"I don't remember anything about that," replied John. "I only remember thinking that it was the most beautiful sight I had ever seen. I hope they are still there."

"You'd think twice about it if you had to rake up all the dead blossoms and leaves," said Fred Wilson. "When we moved to our present home in West Los Angeles, there was a jacaranda tree in the front yard, and I don't think I ever saw such a messy tree in my life, purple blossoms all over the lawn! We took it out after the second year and put in an olive tree."

"Yes, and now you're always tracking olive stains into the house," said Edna. "I think an Indian laurel would have been a much cleaner tree. What do they call it—ficus? They have planted them as street trees in downtown Los Angeles."

"*Ficus retusa* and *Ficus nitida*," put in Bob Eller. "It is true that it is a very neat tree, but it has two serious drawbacks. In the first place, it can get too big—up to 50 or 60 feet tall with a spread of 25 or 30 feet. In the second place, all of these trees in Southern California are infested with Cuban laurel thrips, a tiny flying insect that attacks new foliage—causing the ends of entire branches to turn black. The dead leaves curl, making it practically impossible for sprays to reach them. They have to be sprayed at least four times a year, which can be quite a bother, as well as an expense. In Hawaii, where these thrips also infest ficus trees, they have become quite a nuisance, and there are several instances where they have attacked people, causing hive-like eruptions."

"Well, that brings us back to Shower trees," said John Nicholls. "I would

certainly grow one in Chicago if we had the space and the climate. Can't you grow shower trees in Southern California?"

"Not the same kinds you saw in Hawaii," replied Bob Eller, "because our climate is different. It is true that we have a mild climate, but ours is a winter-rainfall Mediterranean climate, while that of Hawaii is truly tropical. When you return to the mainland, if you will visit the Los Angeles State and County Arboretum in Arcadia, you will find four or five species of shower trees or tree cassias which are every bit as beautiful as those growing in Hawaii but which can tolerate an occasional temperature as low as 27°, and even some of our rare snow flurries."

"But they would still be messy," persisted Edna Wilson.

"Even people would be messy and dirty," put in Lois Nicholls, "if they didn't bathe, shave or visit the barber or hairdresser occasionally and have their clothes laundered and pressed. Anything that is worth while requires some maintenance."

"I suppose that explains the 'beatnicks'," added Virginia Eller. "Whiskers, long hair and shabby clothes allow more time for doing nothing."

"I still don't like dirty trees," said Edna Wilson. "Those dead blossoms under our jacaranda were a perfect mess."

"It all depends upon the point of view," said Bob Eller. "I always regarded the blue-violet blossoms on the grass reflecting the color in the tree as an added bonus. Besides, anything which lives, whether plant or animal, accumulates waste products which must be eliminated. The fallen blossoms and leaves are the trees' waste products. The only way to avoid that is to plant an umbrella."

"Speaking of jacarandas," said Fred Wilson, "I don't see why they allow them to be planted along the sidewalks in some parts of Los Angeles. Someone is liable to slip on the dead blossoms and break a leg."

"And sue the city," added Edna.

"As a matter of fact, it is not easy to slip on the blossoms or on the fallen leaves either, for that matter," said Bob Eller. "About a year ago the Executive Director of Los Angeles Beautiful sent a questionnaire to a number of cities, both in this country and abroad, which were known to have planted jacarandas in business areas, inquiring into this very problem. Replies were completely in the negative—no record of any accidents and no suits. Incidentally, Pretoria, South Africa, has adopted the jacaranda, a native of Brazil, as its official city tree and has planted more than 60,000 of them all over the city. During the spring they have a week-long 'Jacaranda Festival,' which attracts visitors from all over the world. The merchants are happy with the financial returns of this event, and everybody has a good time."

"In other words, they have found that beauty is good business," commented John Nicholls.

"Strange that you should have said that," remarked Virginia Eller. "That is the slogan of Los Angeles Beautiful, a non-profit corporation which began a number of years ago as a committee of the Los Angeles Chamber of Commerce, which is

trying to awaken civic pride and an appreciation of beauty, not only in the citizens of Los Angeles but in the entire Southern California area."

"I have heard of that organization," said Edna Wilson. "My brother, who is in the real estate business, goes to their meetings regularly, and he keeps telling me about a 'Celebrate with Color' program. I don't know what it's all about, but he says color increases property values. He owned some property on San Vicente Boulevard between West Los Angeles and the ocean in Santa Monica which he sold at a handsome profit after the coral trees were planted in the center strip. They certainly do make a show with their brilliant red flowers, but I am afraid they would be dirty."

"There are many species of coral trees, or erythrinas, which are hardy in Southern California," said Bob Eller. "Some of them rival the beauty of the royal poinciana, which is too tender for us."

"You mean we won't have to go to Hawaii to see beautiful flowering trees any more," asked John Nicholls, "that we can see them much closer to home, in southern California?"

"That is exactly the idea," replied Bob Eller. "You will still probably want to go to Hawaii once in a while because they can offer things in their tropical climate which we can't match, and besides, it is a very pleasant trip. But as far as flowering trees and shrubs and vines and other beautiful plants are concerned, you will be able to get the same impact of color from plants that are equally attractive but more suitable to our climate.

"The 'Celebrate with Color' program which Mrs. Wilson mentioned began with an article by Ed Ainsworth in the Los Angeles Times about two years ago. The thought was to concentrate on planting colorful trees, shrubs and other plants over a 5-year period, culminating in 1969, when California celebrates its 200th Anniversary. Mrs. Valley Knudsen, president of Los Angeles Beautiful, seized upon the ideas as exemplifying exactly what Los Angeles Beautiful was striving for. Mrs. Virginia Baldwin is carrying on a very successful campaign as chairman of the 'Celebrate with Color' program.

"In furtherance of this program, two booklets, beautifully illustrated in color, have been published jointly by Los Angeles Beautiful, Southern California Horticultural Institute and California Arboretum Foundation, entitled, 'Flowering Trees for Year-Round Color in Southern California,' and 'Flowering Shrubs for Year-Round Color in Southern California,' both of which can be obtained at the gatehouse of the Arboretum in Arcadia or Descanso Gardens in La Canada if they do not happen to be available at your favorite bookstore. It is planned to add companion booklets on flowering vines and on low-growing plants."

"That does it!" exclaimed John Nicholls. "I was planning on retiring in another three years, but we hadn't quite decided where we wanted to live. Now I know!"

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Smaller Plants for Smaller Spaces

PHILIP CHANDLER

Limited growing areas in restricted gardens require relatively small ornamentals that can add interest and color throughout the year. Smaller rooms and indoor display spaces call for flowers and foliage which harmonize with their surroundings — either as growing plants or as cut flowers and foliage. Certain trees or tree-like shrubs and non-rampant vines produce conveniently small-scale branches, leaves and blossoms versatile for the home and for the garden. Many shrubs with these qualities, as well as controllable small-flowered perennials are available, too. From a long list of such plants we have selected an assortment — some to be grown as small trees or large shrubs; several which serve as medium to small shrubs; together with one useful vine.

Arbutus unedo, the strawberry tree, is a good small tree for almost any reasonably sunny and well-ventilated location, in almost any soil from coast to desert. Its generous clusters of small, white, urn-shaped blossoms are accompanied by a profusion of yellow-to-red fruits, usually most numerous in fall and winter; its dark-green, serrated leaves shine through manzanita-like branches throughout the year. Most effective as a multiple-trunked specimen, this shrub-like tree, usually reaching fifteen to twenty feet, matures with elegance and has many uses outdoors and in.

Clethra arborea thrives only in cool, moist gardens usually coastal, with considerable shade and slightly acid soil. Usually slender and growing to twenty feet, the tree produces fragrant white blossoms (resembling lilies-of-the-valley — hence its popular name) which open abundantly in midsummer and are superb for cutting, or may be left to form delightful light brown seed pods, also useful indoors. This quick-growing tree, with its copper-tipped new growth and red stems, is improved structurally by frequent thinning. Nipping out the leader when very young will produce a rounder, more spreading head.

Escallonia organensis is an old stand-by of wide adaptability, usually encountered as an unidentifiable thicket, and too often sheared and not thinned selectively. When carefully grown in almost any soil or sunny site as an open, billowing shrub, or as a several-trunked tree, it often attains fifteen to twenty feet. Its copious pink-and-white flower clusters, its red-tipped new growth, and its freedom from insects and diseases all add to its popularity as a superior ornamental. It may flower any month of the year.

Melaleuca armillaris is perhaps the most delicate of the common bottlebrush trees of small stature with blossoms and branchlets suitable for cutting. Light green, softly needle-leaved, low-branching and rather open by nature, it may be

sheared as a hedge or pruned lightly as a wind screen, but becomes a real conversation piece when employed as a mature, multiple-trunked tree. Its soft, cream-white brush flowers are delicately ringed with a hint of red during spring or fall in recurrent waves; these are followed by button-like seed pods.

Murraya paniculata is one of our best-groomed great shrubs, probably most effective as a drastically thinned fifteen-foot tree. White canes gleaming vertically through shining fern-like dark leaves on slender branches. The shrub will grace garden or living room in or out of blooming season which occurs in warmest weather. Abundant flowers are small, soft, very white with the scent of orange blossoms. Not for really cold areas, windy exposures, nor poorly drained soil.

A tree capable of reaching forty feet, *Podocarpus gracilior* is adaptable to any intelligent pruning which may train this ever-popular ornamental to vine, wall shrub, informal espalier, tub plant or lush cascade over retaining walls. Linear-leaved, gray-green to deep-green, the species varies greatly in habit and density but always adorns in sun or shade. Every cut frond is valuable indoors or out.

Another little tree or medium shrub of many uses and locations is *Ternstroemia gymnanthera.* Outstanding for cut decoration are its red-bronze new growths of winter and spring, its creamy, drooping little flowers (usually in summer), and the intricate orange-centered seedy fruits in the fall. Appreciative of reasonably fast drainage and moisture in all seasons, it does best in partial shade, especially far south, but full shade can eliminate the plant's distinctive colors and attractive bloom and fruit.

What are more effective and long-lasting cut flowers than the evergreen azaleas? Judicious pruning may produce a small bouquet of lush and exquisite blossoms from even a young plant, delightful alone or with other flowers. "Alaska" is possibly the most nearly ever-flowering white, but among other color choices "Seraphim" is a startling warm pink fall through spring, "Rose Queen" a strong pink which may flower any time, "Rosebud" an outstanding rose for late spring, "Gumpo" white or pink — a miniature shrub to only two feet — and "Firelight," a large shrub, is small-flowered cherry red of intermittent profusion.

Convolvulus cneorum, the silver morning glory bush, is one of the aristocrats of dry, rocky, windswept sites, its narrow silken leaves of shining pearl gray covering a mound-shaped shrub intermittently aglow with wide-funnelled white flowers, shell-pink in bud. The blossoms partially close at night or on a dark day. Foliage lasts especially well indoors and every morning new buds open. Never plant in a wet location.

Euphorbia biglandulosa is a striking, two-foot succulent shrub of great landscape value and of real potential to florists and home decorators who seek dramatic, long-lasting materials. Long grown in southern California, easy and tough in sunny, slightly dry locations, it is still of limited availability in many areas. Leaves are linear, rigid, silver and stemless along light green twisting branches which arrange themselves into a free-form mound covered for six weeks each mid-winter with terminal circles of chartreuse flowers which last two weeks when cut.

In slightly raised beds or when highlighting a bank planting, this *Euphorbia* becomes a dramatic complement to bird-of-paradise, gazania groundcover and rocky out-croppings. Indoors, one cluster of the blossoms fills a small bowl or combines well with more delicate flowers. Cut the flowering stems to the ground when flowers fade to seed pods; new branches will then renew the shrub's shape in two or three weeks. Seeds profusely but difficult to propagate from cuttings.

Strictly a foliage shrub, five to six feet uncontrolled, *Myrsine africana*, the so-called African box, is another of the southwest's most adaptable plants. Clipped formally it makes a far more uniform hedge than most boxwood. Loosely informal as a glossy, dark-green background for flowers, or elegant alone, it adapts to all soils, almost all sites in moderate climate zones. Indoors, cuttings can answer many needs. It may even be trained to tumble loosely from retaining walls or boxes, and is prunable in any season.

Of the many pink-flowered India hawthorns, *Raphiolepis delacouri* is one of the most rewarding, and certainly one of the best for cuttings. Upright spikes of modest, pink single flowers (November to May) are surrounded by small, serrated red-bronze new leaves. This plant thrives with little care in most soils and localities and grows more handsome with age, reaching five to six feet (ten feet uncontrolled). Completely amenable to pruning in all seasons, it remains almost insect free in sun or light shade.

Gelsemium sempervirens is a true vine of many virtues— lightweight, easily controlled, evergreen with many polished surfaces which catch the light and shadow, and curtains of small, golden funnel-form flowers that tumble fragrantly and in profusion for many months, in Los Angeles as early as November, as late as May, usually climaxing in March. Up fences, down walls, from boxes and from vases gelsemium flows with grace either in sun or considerable shade. No insects.

Growing Notes

GEORGE H. SPALDING

An appropriate subject in up-dating "Growing Notes" is *Kennedya rubicunda,* a plant that continues to thrive at the Arboretum even though frozen back rather severely several times. I would recommend it for use as a groundcover rather than as a vine. It is a rampant grower and does not reach over one foot in height except where it can climb upon shrubs or other forms of support. However the original assessment placing it in the category of "chiefly of botanical interest" still holds.

Anigozanthos flavida was mentioned in "Growing Notes" Vol. V, No. 4. It has continued to be a fine plant and is again highly recommended for those who enjoy the beautiful and unusual. Another *Anigozanthos, A. manglesii,* also mentioned earlier, has now bloomed and produced an even more spectacular flower. Experience at the Arboretum has indicated that it should be considered as a rather short-lived perennial, or possibly biennial, since it blooms the second year from seed (occasionally the first year), and then tends to die out.

This may be the result of inadequate knowledge of its growing requirements — or improper culture — as it seldom gets the complete rest that it receives in its hot, dry native habitat. It is a completely herbaceous plant, so we can hardly expect the best results when it is grown among other plants which require and receive summer watering. *A. manglesii* is easily grown from seed, and we will be conducting a number of experiments here at the Arboretum in an effort to determine the best method of culture for southern California. It is a real conversation piece with its ruby red and kelly green flowers, which are also excellent for cutting.

Another species, *A. rufa,* is being grown by at least one specialist in this area and we hope to have plants at the Arboretum soon. This is one of the finest of the *Anizoganthos* with red flowers held erect on 18-inch to 24-inch stalks. It is grown in cultivation in Australian gardens and gives every indication of garden adaptability here.

Kunzea sericea was first mentioned in Vol. VI, No. 1. Over the years our enthusiasm for this graceful shrub has increased. Now about eight feet tall, it retains the same graceful, vase-like form it had in 1956. It has grown with minimal care in the matter of watering and feeding. Unfortunately it does not set viable seed so that we will have to obtain additional supplies from Australia. Repeated attempts to propagate it vegetatively have also failed although some progress is being made in getting cuttings to callous. It continues to bloom prolifically and the long pendulous branches are covered with the typical myrtaceous flower heads so closely resembling *Eucalyptus ficifolia. Kunzea sericea* remains high on our list of potential plant introductions.

Those readers who remember the Note of Vol. VI, No. 2 on seedling Jacarandas, will be interested to know that all the seedlings bloomed violet blue. This was a disappointment, but one of the results that must be accepted when growing seedlings of selections.

It is a pleasure to report that *Gamolepis chrysanthemoides*, mentioned in early "Growing Notes," is now well established in the nursery trade here.

A few random notes on plants previously mentioned: *Loropetalum chinense* can again be found in nurseries. Not easily but plants are available occasionally. The Cassia noted in Vol. XIII, No. 4 as *Cassia glauca* has now been determined to be *Cassia surattensis var. suffruticosa.*

It is always gratifying to have one of the Arboretum introductions become popular with both the nurserymen and the public. The trailing African Daisy *(Osteospermum fruticosum)* is one such plant. It is now being grown in large quantities and is widely used as a groundcover throughout much of southern California.

The "something new" for this issue is Agapanthus 'Queen Anne.' This is a medium height Agapanthus reaching about 18 inches to 2 feet. The flowers are a very rich, deep blue borne in heads approximately 3 to 4 inches in diameter. It is one of the completely deciduous varieties and it is easy to damage the plant if extreme care is not taken when cultivating the planting area when it is dormant. The size of the flower heads makes it useful for cutting and the plant as a whole is just right for the smaller garden.

In future "Growing Notes" I hope to provide an additional list of germination times for some of the lesser known plants, as well as notes on many of the new plants being tested at the Arboretum. Some brief items on seed sowing mixtures, together with information on special treatments for difficult-to-germinate seed will be among other topics discussed. Finally if any readers have plants on which they would like to see Notes, drop a line to the author, in care of *Lasca Leaves*, and he will try to help.

1967 Coming Events

February 25, 26:	*Camellia Show*
March 3, 4, 5:	*Southland Orchid Show*
April 1, 2:	*April Society International Show*
April 8, 9:	*Operation Green Carpet, Lawn Clinic*
April 14, 15, 16:	*Spring Flower Show and Art Festival*
April 22, 23:	*Amaryllis Show*
April 29, 30:	*Iris Show*
May 7:	*Epiphyllum Show*
May 13, 14:	*Geranium Show*
May 26, 27, 28:	*Bonsai Exhibit*
June 24, 25:	*Gladiolus Show*
June 30, July 1, 2, 3, 4:	*Cactus and Succulent Show*

Exact dates to be announced:

July:	*Begonia Show*
October:	*Fall Flower Show*

NOTE: For information covering exact times of events, entry regulations for exhibitors, sponsoring groups, etc., consult the Arboretum, 301 North Baldwin Avenue, Arcadia; telephone 446-8251.

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THE COVER

Our cover photograph features an Arboretum introduction, the *Acacia cardiophylla* A. Cunn. With its golden yellow flowers which appear in February, the lovely *A. cardiophylla* can be grown as either a small tree or large shrub. The specimen shown on the cover is located in the Arboretum's Australian section.

Poisonous Plants in California

Mrs. Harriet Bonner and Dr. A. J. Haagen-Smit

The study of the poisonous plants is of vital interest to many groups of the population, to the farmer as well as the Sunday hiker, to the medical profession as well as to industry. A thorough knowledge of this subject can prevent the costly loss of cattle, the spoiling of a vacation trip, and it may add to our knowledge of drugs beneficial in medical treatment.

With the exception of dermatitis-causing plants and those which produce toxic berries like Daphne and Liguster, we find the victims among the domestic animals.

The importance of this subject may be realized when we look at the annual losses of livestock due to plant poisoning. They are estimated to exceed several million dollars. A large part of the loss due to stock poisoning is preventable and calls for little more than the recognition of dangerous plants and reasonable care in pasturing animals. The frequency of poisoning is often determined by the availability of more suitable food. Most cases of stock poisoning occur in the early spring when the grass is still short and other forage is scarce, or in late summer when the grass dries up, or the pasture is overgrazed so that the animals are forced to eat anything which looks green. In such cases we cannot rely on some instinctive reaction of the animal for protection.

The plants which contain poisonous substances belong to a large number of different families and the chemical study of these plants has shown that most of the poisons produced in the plant are typical for the genus or species. We find among them: alkaloids, saponin-cyanogenetic and mustard oil glucosides, resinoids, phytotoxins, phenols, acids, selenium and a number of compounds which are chemically still unknown. Although the pharmacological reactions differ from compound to compound, we can for convenience and lack of better classification discuss the poisonous plants partly on the basis of the production of similar physiological action, partly on the basis of the chemical nature of the toxic principle.

PLANTS CAUSING DERMATITIS

The largest number of cases of poisoning in men is caused by contact poisoning. The resulting skin disease or dermatitis may be a slight irritation of the skin or a painful inflammation with vesicles or blisters lasting from a few days to several weeks. Cases are recorded which ended with death. By far the most common cause of plant

dermatitis is Poison Oak. Not everyone, however, is sensitive to these plants. From statistical experiments carried out to determine the toxicity of poison oak, it was found that only 60% of the people who came in contact with this plant developed a skin irritation (*Primula obconica* 6%). In most other cases this proportion is much more favorable and dermatitis is developed only in individuals who are especially sensitive or allergic to a certain plant. The effect of these contact poisons on animals seems to be negligible. In the case of poison ivy, the toxic principle has been studied and it was found that a chemical compound related to the phenols was responsible for the skin irritation. A similar phenol is known to be present in other representatives of the rhus family, in the oil of the chinese lacquer tree and in the oil of the seed hull of the cashew nut, *Anacardium occidentale.* These poisonings are of a similar nature to dermatitis sometimes caused by phenolic developers. On the basis of the phenol properties of the active component (urushiol), the most successful treatments are based on oxydation (5% ferric chloride in 50% alcohol, potassium permanganate and peroxides) and the solubility in alkali (thorough washing with soap under a shower, not a tub bath). The treatment with injections is based on a misconception of the nature of the active principle and is not without danger. Oils and fats dissolve the toxic principle and spread the irritation so they should be avoided.

Well known dermatitis-causing plants found in California are:

Ailanthus altissima sw. (Cultivated)
Borago officinalis L., Borage (Cultivated)
Cypripedium spp. Ladyslippers
Encelia california Nutt.
Euphorbiaecae spp. spurges
Ginkgo biloba L. (Cultivated)
Melia Azedarach L. (Cultivated)
Pastinaca sativa L., parsnip
Phaelia spp.
Primula obconica, Hance, primrose (Cultivated)
Rhus diversilobia T. and *G.,* Poison oak
Smodingium argutum (Cultivated)

PHOTODYNAMIC PLANTS

Some plants cause a remarkable disease in animals with white or unpigmented skin. A photosensitization is produced and the resulting symptoms are dermatitis, blistering of the skin, loss of hair, etc. It has been found that the activating light has a wave length between 5800 angstroms and the red end of the spectrum.

In California representatives of this group are:

Agave lecheguilla Torr.
Fagopyrum esculentum, Moench (Buckwheat, seeds)
Hypericum perforatum L. (St. Johns wort)
Tribulus terrestris L. (Puncture vine)

PLANTS CAUSING HYDROCYANIC ACID POISONING

Many plants contain one of the most serious and fast-acting poisons which we know: hydrocyanic acid. This acid is in most cases not free in the plants but in glycosidal linkage and is set free by enzymes. One of the glycosides is amygdalin which gives on hydrolysis hydrocyanic acid, glucose and benzaldehyde. It is rather fortunate that hydrocyanic acid is a gas at ordinary temperatures and that it is a weak acid. The salts are therefore completely decomposed by a long exposure to the air and the danger of poisoning by dried forage containing cyanogenetic plants is therefore small. Definitely known to be poisonous on account of a high hydrocyanic acid content are the following plants in California:

Holcus lanatus L. (Velvet grass)
Photinia arbutifolia (Christmas berry)
Prunus demissa Walp (Western choke berry)
Sorghum vulgare Pers. (Sorghum, imported)
Triglochin maritima L. (Arrow grass)

PLANTS PRODUCING UNDESIRABLE FLAVOR IN MILK AND MILK PRODUCTS

We also find listed among the poisonous plants those which cause a disagreeable taste in milk and which, in this indirect way, may cause important losses to the farmer. Often troublesome are members of the family of the cruciferae since they contain mustard oils and their glycosides which give on hydrolysis bad smelling products like mercaptans. Well known for this behavior are several allium species (garlic and onions) and brassica species (mustards, turnips, *Brassica arvensis,* wild mustard).

PLANTS CAUSING MECHANICAL INJURY

Some plants are indirectly the cause for loss of cattle because they possess hard sharp awns, spines or thorns. The wounds inflicted by such plants may seriously hurt the animals through secondary infection or obstruction in the digestive tract. In California we find the following plants of this type:

Aristida oligantha Michx. (Wiri grass)
Avena fatua (Wild oats)
Cacti spp.
Platanus occidentalis (Sycamore)
Stipa comata Trin & Rupr. (Needle and thread grass)
Tribulus terrestris L. (Puncture vine)
Xanthium spp. (Cockleburs)

SAPONIN CONTAINING PLANTS

Saponins are well known for their property to give solutions which foam like soap solutions. Most of these saponins are harmless when taken by mouth but some are very toxic. They have a haemolytic action on the red blood corpuscles as well as a depressing effect on the central nervous system. These saponins occur in many plant families. Well known saponin families are the *Compositae, Cariophyllaceae* and *Scrophulariaceae*. Saponins are glycosides which given on hydrolysis sugars and

sapogenins, substances related to sterols, bile acids and resin acids. In California we find *Saponaria officinalis L.*, Bouncing bet, which causes a good deal of trouble to sheep raisers. Symptoms are loss of appetite, cessation of rumination, indications of abdominal pain, frothing at the mouth and a green discharge from the nose.

OTHER TOXIC GLYCOSIDAL PLANTS

Glycosides, as we have already seen, are substances which on hydrolysis yield a sugar and a non-carbohydrate fragment the aglycone. These kind of substances are widely distributed among the plants and some of them are highly toxic. The chemical nature is not known in most cases.

Aesculus californica Nutt (Buckeye)
Apocynum cannabinum L. (Indian hemp)
Daphne cneorum L. (Berries dangerous to children)
Digitalis purpurea L. (Foxglove)
Hedera helix L. (English Ivy, berries dangerous to children)
Helenium hoopesii A. (Gray sneeze weed)
Nerium oleander L. (Oleander, leaves highly toxic)
Xanthium orientale L. (Cockleburs, seeds and early stages of the plant)

OXALIC ACID-CONTAINING PLANTS

Well known for their oxalic acid content are species of *Rymex*. Other plants in California containing this poison are:

Rheum rhaponticum L. (Rhubarb)
Sarcobatus vermiculatus Hook (Greasewood)
Chenopodium ambrosiodes L. (Wormseed)

ALKALOID-CONTAINING PLANTS

All plants contain basic nitrogenous substances. A number of these substances have drawn the attention because of their strong action on the nervous system. These so-called alkaloids are mostly complex ring systems containing nitrogen. Characteristic for their alkaloid content are families such as the legumes, *Ranunculaceae, Solanaceae, Papaveraceae, Liliaceae* and *Amaryllidaceae*. Important alkaloidal plants in California are:

Aconitum columbianium Nutt (Western monkshood)
Argemone mexicana L. (Mexican poppy)
Conium maculatum (Poison hemlock)
Corydalis caseana Gray (Fitweed)
Datura stramonium L. (Jimson weed)
Delphinium californicum T. and *G.* (Coast larkspur and other spp.)
Dicentra formosa Andr. (Western bleeding heart)
Dicentra uniflora Kell (Steershead)
Dicentra chrysantha Walp (Golden eardrops)

Dicentra ochroleuca Engem.
Erythrina spp.
Eragrostis cilianensis Link (Stink grass)
Equisetum arvense L. (Scouring brush)
Gelsemium sempervirens Ait.
Lolium temulentum L. (Darnel)
Lupinus spp. (Lupins)
Nicotiana attenuata Torr. (Wild tobacco)
Nicotiana trigonophyllae Dunal (Desert tobacco)
Nicotiana glauca R. Grah. (Tree tobacco)
Ranunculus repens L. (Creeping buttercup)
Senecio vulgaris L. (Groundsel)
Solanum Dulcamara L. (Bittersweet)
Solanum Nigrum L. (Black nightshade)
Solanum tuberosum L. (Irish potato)
Solanum pseudocapsicum L. (Jerusalem berry)
Veratrum californicus Dur. (Hellebore)
Zygadenus spp. (Death camas)

PLANTS WITH UNKNOWN TOXIC PRINCIPLES OR NOT BELONGING TO THE GROUPS MENTIONED

Actaea spicata or *arguta L.* (Misteltoe, berries)
Anagallis avensis L. (Scarlet pimpernel)
Arisoema triphyllum L. (Jack in the pulpit, root)
Asclepias eriocarpa Benth. (Milkweed)
Baileya multiradiata Harv and *Gray*
Buxus sempervirens L. (Boxtree cult.)
Astragalus spp. (Locoweeds, suspect, might indicate selenium containing soil)
Cannabis sativa L. (Hemp)
Cicuta spp. (Hemlock)
Eremocarpus setigerus Benth. (Turkey mullein)
Euphorbiaceae (Spurges)
Iva xanthifolia Nutt (Marsh elder)
Kalmia polifolia Wang (Swamp laurel)
Ledum glandulosum Nutt (Labrador tea)
Leucocrinim montanum Nutt (Mountain lily)
Leucothoe davisiae Torr. (Black laurel)
Melilotus alba Desr. (Sweet clover, suspect)
Oxytenia acerosa Nutt.
Phoradendron flavescens Nutt. (Mistletoe, berries)

Pteridium aquilinum, Kuhn var. *lanuginosum* (Fern bracken)
Quercus spp. (Oaks)
Rhododendron occidentalis Gray (Western azalea)
Rhododendron californicum Hook
Ricinus communalis L. (Castor bean)
Tetradymia glabrata Gray (Spring rabbit brush)
Tetradymia canenscens DC (Spinless horse brush)

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Dr. Samuel Ayres, Jr., M.D. and Diplomate of the American Board of Dermatology comments as follows on the foregoing article:

"The authors of this article have done a good deal of research on the problem and I would like to add several additional plants which are capable of causing contact dermatitis, notably *Philodendron cordatum,** the common house plant. This is not commonly recognized as a potent source of irritation and yet many people are exposed to it. Another plant, the shrub *Weigandea caracasana* was responsible for one severe case of contact dermatitis in my experience. *Grevillea banksii* and *Grevillea robusta* have also been reported as sources of contact dermatitis. Dermatitis from Lantana, English Ivy and Algerian Ivy have also been reported. Iris tubers may cause trouble by direct contact with the tubers or as a result of contact with orris root which is derived from this source and may be incorporated in face powder or powder for surgeons' rubber gloves. I have seen one instance of dermatitis from the latter in a surgeon. There is one type of lime which is capable of causing photo sensitivity. In other words, a dermatitis from contact plus exposure to the sun.

"With reference to the treatment of plant dermatitis, the measures mentioned in the article would be considered highly inadequate under present day conditions. Severe dermatitis from poison oak or any of the several plants mentioned can be easily and promptly controlled by a combination of steroids (cortisone derivatives) both externally in the form of a cream and internally in the form of a pill. The oral medication is usually started with a dose of five a day for two days, gradually being reduced over a ten-day period. Relief is almost instantaneous and the patient is able to continue with his former activities without the discomfort and unsightly appearance that otherwise might last two to four weeks."

Samuel Ayres, Jr., M.D.

*Ayres Jr., Samuel and Samuel Ayres III, 1958. "Philodendron as a cause of contact dermatitis." A.M.A. Arch. of Dermatology. 78:330-333.

Fire Resistant Plants

DR. ROBERT L. GONDERMAN AND FREDERICK BOUTIN

In early November, 1966 a fire erupted in the San Gabriel Mountains north of the Sylmar-Pacoima area of Los Angeles County. A portion of this fire encroached into a section of the fire-resistant plant test plot surrounding the chaparral approaches to the Olive View Sanitarium in Sylmar. This test plot was established in 1962 following a fire which destroyed the main hospital at Olive View and resulted in damage in excess of one million dollars.

The test plot of fire-resistant plants at Olive View consists of a planted band, 100 to 300 feet deep and about 400 feet long, separating a portion of the developed hospital grounds from the unmaintained hills. These hills sustain a cover of extremely combustible native brush and scattered eucalyptus trees.

The fire-resistant plants were set out approximately in five-by-five-foot grid patterns, depending upon the terrain. Following completion of the planting, irrigation was performed only when drought conditions became acute, and no further maintenance work was done.

Fire-resistant plants employed for this area consisted chiefly of *Atriplex halimus* and *Cistus ladaniferus*. These were among the first plants recommended through applied research at the Los Angeles State and County Arboretum through the efforts of Dr. L. B. Martin, Mr. F. C. Ching, and the Arboretum's Director, Dr. W. S. Stewart.

The recent fire burned into the eastern end of the test plot. The fire also burned into bank control plantings along the road atop the Los Pinetos Ridge above Loop Canyon. Reports of post-fire results at both of these sites are based largely upon visual observations and accounts obtained from individuals who witnessed the conflagration.

One observation was that the fire-resistant plants had reached neither the size nor the density to stand as a major barrier to the progress of the fire. Fire-resistant plants were still relatively small in stature and had not attained adequate coverage within the planting areas. Estimated coverage for *Cistus ladaniferus* was about 25 percent, while ground coverage for the *Atriplex halimus* was closer to 50 percent.

Natural brush and grasses were found in varying densities, being sparse on ridges and tall and heavy in canyon bottoms and more protected sites. In some places the brush was extremely thick, providing a fuel volume approximately four times that of the *Cistus*. In sites where the *Cistus* plantings were closer together, a relatively small amount of native vegetation had grown, so that little fuel was present. Here the fire had burned into the edge of the planting, then traveled around it through the heavy brush along the canyon bottoms. The fire also burned between the *Cistus* in places where the plantings were widely spaced.

Arrow points to stand of *Cistus ladaniferus* which remained unburned during the fire. Dark areas were completely burned over.

Atriplex halimus was generally planted in drifts on ridges. Here little native vegetation had grown, and the fire had been stopped. Again it was noticed that fires had burned laterally into bushy areas and traveled around the *Atriplex* plantings, indicating the effectiveness of the *Atriplex* as a barrier.

Roger Welch, Superintendent of Grounds at Olive View has requested more fire-resistant plants to fill in between the existing plants in order to provide a greater degree of protection.

A review of post-fire results at sites along the Los Pinetos road above Olive View Sanitarium and the Veteran's Administration Hospital revealed a fire of a very different character. Here the fire, generated in part by strong winds, had "funnelled" up canyons leading to the ridge. Observers reported that winds of 50 to 70 knots were registered at the nearby U. S. Army Nike site, and that flames had leaped to 50 to 70 feet into the air.

Plants had been placed here in two adjacent rows, primarily in order to control bank slippage on new road fills. This was done approximately eight to ten years ago.

In this intervening period of time, because of harsh mediterranean climatic conditions with precipitation largely limited to the winter months (and then only averaging 14.7 inches), several plantings had died, and seedlings had generally not maintained the density of the stand.

Observers reported that the flames had engulfed and had jumped *over* the bands of *Cistus ladaniferus* before the plants themselves burned. Most of these plants were incinerated. In a few instances, however, the upper side — away from the fire — had remained green.

Melted bottles attested to a ground temperature in the area of 1800 to 1900°F, which is considered to be very hot even for a fire of this magnitude.

The Sylmar-Pacoima disaster indicated that narrow bands of fire-resistant plants cannot contain fires of this size and intensity. More extensive plantings, together with control of flammable vegetation would bring greater effectiveness.

The portion of the fire near the Olive View facility was reportedly started from a fire ball coming from the direction of the Veteran's Hospital. These fire balls can be carried over comparatively wide expanses and start new fires ahead of the main fire front. Fire balls can be propelled over even wide bands of fire-resistant plants, just as they can travel over fire-breaks.

The results of the post fire survey indicate the need for more dense and continuous covering of fire-resistant plants to provide an effective barrier against the spread of fire. Close initial planting appears to be the means to establish a rapid cover. A pre-emergent herbicide, applied at the time of transplanting, might be effective in reducing competition from combustible regrowth. And broad bands, which flames are not likely to jump over, can act as physical barriers to encroaching or spreading fires — a benefit which erodable bare soil cannot provide.

The Vanishing Natives

DR. MILDRED E. MATHIAS

Seventy-five million years ago the state of California was only a relatively flat piece of land, no people, no deserts, no Sierra Nevada; a land where the temperatures were much higher than now, and more uniform, and the rainfall as much as 80 inches, spread more or less uniformly throughout the year; the vegetation was a subtropical forest something like that which exists today from southern Mexico to Panama; a forest of fig trees, avocado, cinnamomum, palms and cycads.

During the 75 million years since, there have been major changes — the land is no longer flat and we now have coast ranges, transverse ranges and the Sierra Nevada. These have produced rain shadow effects to give us deserts; temperatures are less uniform and generally lower; summer rains have been eliminated and total annual rainfall is much lower in most of the state; and we have people in abundance.

What has happened to the vegetation? As the temperature became lower and the rainfall less and seasonal, the subtropical forest flora was restricted southward and eventually eliminated from the state to be replaced by plants adapted to the more rigorous climatic conditions. Many of these plants came from a temperate flora which had been developed in Canada and Alaska and which moved southward with changing conditions to occupy the rising mountain slopes and the cooler areas of the state and to become the forests of the North Coast ranges and Sierra Nevada of today, as well as to occupy a few mountain areas in southern California. But this cool-tolerant vegetation still needed more moisture than that available in much of the southern and interior areas and there a special vegetation developed, derived in part from the older temperate flora of the north and the subtropical flora, a vegetation characterized by woody, drought-deciduous, small-leaved plants.

What we have today in California is a vegetation tapestry woven of threads of many ages and many origins: one native palm, two genera of the tropical rue family, one representative of the tropical acanthus family, and a few other plants which may be secondary derivatives of the old tropical flora; firs, maples, alders, dogwoods, sequoia, pine, spruce, and deciduous oaks from the north temperate forests; and live oaks, pinyon pine, cypress, mountain mahogany, mesquite, and creosote bush from the derivative intermediate drought-resistant flora.

The result is a modern California flora known for its size and diversity — over 6800 native species of ferns and seed plants. The unusual aspect of this flora is the high degree of endemism; of the 6858 native species, 2604 (or 39.7%) are endemic, that is, confined within the boundaries of the state. This unique flora, which has taken over 75 million years to develop is, of course, changing constantly just as it has changed in time, but the normal slow change is now becoming a rapid one with man on the scene. The threads of the tapestry are being cut, the edges are becoming ravelled, and large holes are appearing in it. One wonders how long we will keep some

of our rare plants, or even some of our common plants.

We have large areas of vegetation protected in national parks and forests, in state parks, in country preserves but much still needs protection. The endemic plants are of particular interest. Some of these are wide-ranging within the state — plants such as *Eriogonum parvifolium,* common on bluffs and dunes along the coast from Monterey County to San Diego County; *Penstemon grinnellii,* on gravelly slopes from 4500 to 9500 feet, from the San Gabriel Mountains to the Santa Rosa Range; and *Torreya californica,* the nutmeg tree, in cool shaded canyons in the coast ranges from Santa Cruz to Mendocino counties and in the Sierra Nevada foothills from Tulare to Tehama counties.

Others are very local; in a quick check through the 1959 flora of Munz and Keck 380 species were noted which are known from one locality only; sometimes this locality may be comparatively large such as that for *Eriophyllum mohavense,* known only from within 30 miles of Barstow; *Phacelia orogenes,* from meadows near Mineral King; or restricted such as *Brodiaea versicolor,* rare in the closed-cone pine forest at Point Lobos State Park; *Cirsium rhothopilum,* dunes at Surf, Santa Barbara County; *Cirsium fontinale,* in wet spots in clay overlying serpentine, near Crystal Springs Lake, San Mateo County; *Arctostaphylos nissenana,* near Placerville; *A. edmundsii,* ocean bluffs, mouth of Little Sur River, Monterey County; *A. pumila* and *A. hookeri,* both from the closed-cone pine forest at Monterey Bay; *A. densiflora,* banks along roadside Vine Hill Schoolhouse, about ten miles west of Santa Rosa, Sonoma County: *A. acutifolia,* Log Springs Ridge, southwest Tehama County; *A. glutinosa,* west of Bonnie Doon Ridge, Santa Cruz Mountains, growing in chaparral on Monterey shale from a small area on the ridge between Scott and Mill creeks, southwest of Eagle Rock; *A pajaroensis,* sandy hills, near Prunedale, northern Monterey County: *Navarretia pauciflora,* vernal pools in volcanic rubble, five miles north of Lower Lake, Lake County; *N. plieantha,* peaty margin of Bogg's Lake, Mount Hannah, Lake County; *Penstemon personatus,* known from three colonies in Butte County; *P. tracyi,* rock crevices at 7000 feet, Devil's Canyon Mountains, Trinity County; *Cheilanthes parishii,* from Andreas Canyon near Palm Springs; *C. fibrillosa,* known only from a single collection in chaparral, San Jacinto Mountains; *Asplenium viride,* known only from crevices in north-facing cliff, South Butte, north of Sierra City; *Agrostis aristiglumis,* diatomaceous shale, west of Mount Vision, Point Reyes; *Haplopappus ophitidis,* serpentine soil, 5000 feet, known only from the summit of Mount Tedoc, northwest Tehama County; *Githopsis latifolia,* known only from a collection at Big Meadows, Plumas County; *Erigeron calvus,* foot of Inyo Mountains, about four miles north of Keeler; *Clarkia lingulata,* known from two places on the Merced River, Mariposa County.

One wonders how long some other species will survive in their present ranges, or if they are still with us, as for example; *Astragalus trichopodus* in three restricted areas of southern California: the immediate coastline of southern Santa Barbara and northern Ventura counties, the south end of Catalina Island, and inland on the Puente and Chino hills; *Grindelia humilis,* coastal salt marshes, San Francisco, San Pablo, and Suisun Bays, *Cordylanthus mollis,* coastal salt marsh, north shore of San Francisco Bay; *Monardella pringlei,* sandy places near Colton; *Pogogyne abramsii,*

beds of dried pools on the mesas from San Diego to Miramar; *Githopsis filicaulis,* Mission Canyon, San Diego. And we know some *are* gone from California: *Potentilla multijuga,* near Ballona, Los Angeles County; and *Agave shawii,* from near the Mexican boundary, but fortunately still surviving below the border.

Why should we conserve a flora so diverse? Why can't we do without a species or two, particularly some of the very local endemics? True, we probably would never miss them and we may lose some of them through natural changes. But the very characters which make it possible for the elephant tree to survive as far north as the California desert may be important in some future breeding program involving elephant trees; the characters which enabled the northern conifer flora to reach the southern California mountains may be important in breeding for forest trees for some other dry area of the world. Each of these plants has what we call a "gene pool," a capacity to live in its present environment and possibly a reserve which will enable it to move into a new environment, a capacity which may be unique for that population. We know that plants of the same species have very different tolerances to the factors of climate, different resistance to diseases, different potentials for production of chemical compounds. Because a plant has no known use does not mean that it is "worthless." For example, the meadow foam, *Limnanthes,* a little California native genus until now used only as an ornamental in English gardens, has recently been found to have seed containing a unique oil that promises to be of great value in production of commercial waxes, special-purpose detergents, and lubricating oils. Some native plants have been found to contain medicinal qualities. We can add to these the compelling arguments for plant conservation because of erosion control, amelioration of climate by providing shade and shelter, and the esthetic values plants provide.

We know that we cannot stop progress, the age of the bulldozer is here; urbanization cannot be stopped. Conservation is faced with several prospects. We can save representatives of our flora in cultivation — in botanical gardens like those at Santa Barbara, Rancho Santa Ana, and Tilden Park in Berkeley; in home gardens through the activities of such groups as the Theodore Payne Foundation. We can educate people to our conservation needs through organizations like the California Conservation Council and California Tomorrow. We can indirectly save the native flora while also preserving the animals by supporting such organizations as the Audubon Society and the Committee for the Preservation of the Tule Elk. We can support research by promoting the University of California program of native preserves, a program which will preserve for study and research over fifty areas, representing every major habitat within the state, and one which has a good start with the Boyd Deep Canyon site of over 2800 acres. We can fight the battle of conservation on many fronts through the Wilderness Society, the Desert Protective Council, and the Sierra Club. We can confine our interests to plants alone with the Save the Redwoods League or the California Native Plant Society.

We can help in the purchase of land through the Nature Conservancy, a national organization in the real estate business of conservation. Here in California, the Conservancy owns or is purchasing the Blanche Hamilton Wildlife Sanctuary, with its juniper-pinyon-yucca, near Devil's Punch Bowl; Spindrift Point, Marin County, with its bluff vegetation; the Williams Wildlife Sanctuary near Glennville with digger pine

and blue oak; the Edmund C. Jaeger Nature Sanctuary of desert shrubs near Desert Center; Buena Vista Lagoon, a fresh water lake at Oceanside; Ernest W. Cleary Reserve in Napa County, a mosaic of chaparral, grassland, and forest; Alice Ewing Preserve of coastal scrub near Rancho Santa Fe; Molera Tract in Monterey County, at the mouth of Big Sur River; Sand Ridge Wildflower Preserve near Bakersfield; Tulare Vernal Pools Reserve near Pixley; Kent Island, Bolinas Lagoon; Northern California Coast Range Preserve of Douglas fir in Mendocino County. The Conservancy has cooperated with the Board of Supervisors of Los Angeles County in getting five wildlife sanctuaries dedicated in the Mojave Desert; has acted as an intermediary with the state parks system in the acquisition of state preserves, the Forest of Nisine Marks in the Santa Cruz Mountans, and Rancho Montana de Oro in San Luis Obispo County.

Each of you has a responsibility as a citizen to see that our conservation efforts increase. When a species is destroyed it cannot be replaced; what we lose today is gone forever.

Book Review

Fantastic Trees, by Edwin A. Menninger. 304 pp. Illustrated. Bibliography and index. Viking Press, 624 Madison Avenue, New York 10022. 1967. $8.95.

Unique in coverage, citation and human interest is this gathering of unusual tree lore. Edwin A. Menninger, an authority on ornamental trees for warm climates, carries his readers over the world in colorful style to a wealth of arboreal acquaintances.

We meet plants with strange parts, like the tree of the scarlet hands, and the South African Welwitschia which produces only two leaves during its lifetime of many centuries. There are strange specimens like the efficiently versatile park tree, the South American ombu. There are trees of odd behavior such as the noise-making African oil bean and the corkscrew-stemmed Indian sandan. And "rugged" individualists" like the precision-blooming simpho of Malaya which produces flowers every day.

Nearly one-fourth of the book is devoted to well reproduced black and white photographs, from a variety of sources, that abundantly complement the text.

The author draws many analogies between human and arboreal eccentricities, with their common denominator of environmental wrestlings. Fact is clearly distinguished from fancy; statements are carefully referenced. One of the values of the book relates to superstitions about trees.

The note section at the end of the book, particularly the scientific names, might better have been included in the text; reference is a bit cumbersome. The notes and bibliography, however, constitute an important feature, both as source materials and as enticement to further explorations among "fantastic trees."

— LYDIA S. BOWEN

An Emigrant Palm

EDWARD PUGH

On the north side of the Hugo Reid Adobe, at the bank of the Arboretum lagoon, there grows a landmark as familiar, perhaps, to Arboretum visitors as the old adobe itself. This of course, is the sturdy date palm (Phoenix dactylifera) leaning out over the lagoon.

We can be fairly certain that this palm has been here at least since the 1880s. for a photograph taken at that time shows a young palm tree in the right place, and at just about the right size.

Who planted this historic and well-known tree? The available information would seem to point to one man.

According to Roy W. Nixon (LASCA LEAVES, January 1952), the first date palms in California were grown from seeds planted by the early mission fathers at many of the California missions along the coast.

Some years later, in 1857, to be exact, J. R. and William Wolfskill made several plantings of this South African tree in the foothills west of Davis in the upper Sacramento Valley. Several years after that, William Wolfskill came to southern California, and purchased the Rancho Santa Anita. It seems reasonable therefore, to assume that he may have brought the date palm with him.

The late Susanna Bryant Dakin substantiates this (LASCA LEAVES, Summer 1956) by stating that Wolfskill planted both eucalypti and date palms in the 1860s. during his ownership of the Rancho.

Thus, like so many other fine old emigrant trees at the Arboretum, the date palm by the adobe probably owes its existence to William Wolfskill.

ED
PUGH

Confessions of a Volunteer

NANCY ZABRISKIE

"So you are a volunteer at the Arboretum! But what, exactly do you do?"

When my friends ask this question they usually want only a short answer which will confirm their suspicions that I'm merely trying to dodge the committee they think is more important. They must have a strange variety of ideas of what I do, because each time the question is asked, the answer may be different. It would help if they understood the function of the Arboretum itself, and the Youth Section in particular.

Under the direction of Mrs. Gertrude Woods, Education Specialist, the Youth Section at the Arboretum attempts to meet some of the needs of children who, already in love with "nachur," fill the after-school and Saturday classes to look, feel, smell, taste, listen, and ask questions; to pinch and pull, plant and pluck, in their eagerness to satisfy their curiosity. There are special classes during school hours for handicapped children, or gifted ones; there are classes for leaders of youth groups; there are special interest field trips; there are school bus tours, summer workshops, Christmas celebrations and Arbor Day programs!

Now this is a pretty big order to fill. There were 540 children registered as students in classes at the Arboretum alone last year. Extra hands are needed, and volunteers are welcomed. In order to encourage more help and to give an idea of some of the possibilities, I'd like to outline here the variety of really "fun" things I've been privileged to do during the past two years. They run from simple housekeeping chores in office, classrooms, museum, greenhouse, and gardens, through preparation of materials and setting up for classes as well as assisting teachers, to actually taking youngsters on short field trips and teaching classes. Yes, there are other volunteers aside from me, but not enough. Please excuse me for talking only about what *I* have done — it is a way of being specific, to help you see where *you* might help.

At first I took phone calls and handled registration which is done by mail. Then I added cleaning out the mouse cages, whose tenants were increasing in order to satisfy the summer appetites of the snakes. (It only took about fifteen minutes to sift through the bottom of the trash can to find the five tiny naked mice I dumped out by mistake!) Hummingbird feeders had to be kept filled with syrup, and the large bird-feeder covered with seed. One day when Mrs. Woods was away, the ladies from the herb society found a dead but beautiful little barn owl on the grounds. When it was brought in I had to decide what to do with it — which was to wrap it up and put it in the refrigerator with the hummingbird syrup, and my lunch, to wait for someone to take it to the McCurdy Nature Center at Eaton Canyon where there is a taxidermist. (Amateur taxidermists please note: your

services could be used, for other birds are found similarly and could be permanently placed in our own Children's Museum instead of being given away.)

Gradually I was provided with a wider range of activities including:

(a) Cleaning and rearranging the seed cabinet — a large glass showcase whose shelves are filled with various engaging items made of seeds and pods by children in the "Art in Nature" classes;
(b) Cutting paper for name tags, Christmas decorations, mounting pictures — a perpetual job — reams of odd sizes of colored paper are needed;
(c) Mounting pictures, covering them with plastic so they will be durable enough to use over and over in the classes to show fruits and vegetables, flowers, trees. insects, birds, whatever may be appropriate to the topic under discussion;
(d) Typing and filing student record cards; addressing envelopes and post cards: envelopes; mailing;
(e) Spray painting plant labels: spray painting milk cartons to be used as planters;
(f) Gathering acorns; collecting different kinds of eucalyptus caps; collecting seeds;
(g) Bringing pine cones and bits of wood from the mountains;
(h) Collecting more than 100 one-gallon glass jars from school cafeterias and helping to use an electric-wire glass-cutter to remove the tops so they can be converted to terrariums;
(i) Pressing leaves; sorting leaves and organizing the plant presses;
(j) Using dry pressed tree leaves to make a large tree-shaped sampler-poster to hang on the museum wall;
(k) Using "Contac" (a clear plastic self-sticking material) to cover leaves on windows;
(l) Helping to cut boughs of cypress into smaller pieces for the children to use for making wreathes;
(m) Organizing the accumulation of notes on the water birds of Lasca Lagoon and making a chronological outline which included information on the fish situation — (the carp had become so big and numerous they were eating the ducklings, so a fish-kill was ordered and the lagoons restocked with mosquito fish and red-eared sunfish.)
(n) Emptying, cleaning and refilling the aquarium (a tank demonstrating "life in a balanced pond community" which really balances pretty well except that after 6 or 8 months the algae on the glass walls becomes so thick we can't see the crayfish, mosquito fish, snails, and water plants inside!)
(o) Watering the green house; cleaning up in the greenhouse, removing dead foliage from stock plants (sources of much of the material used in classes) and pulling weeds from under the benches.

It was not obvious to me that I was working up to teaching my own classes. I'd already told Mrs. Woods I couldn't do that. No experience . . . too much responsibility . . . I'd help, though. We collected succulent tip cuttings in the African Section and once I set up the materials for her class when she had to be away until time to begin. This meant preparing twelve cuttings of each of six different kinds of succulents, arranging them around the big outdoor work table with planting soil

heaped along the middle, with the flats, planting sticks, labels, etc., handy so the children could get right to work. Since this was preceded by a classroom demonstration of propagation methods and was followed by a field trip, all of which had to fit into an hour and forty-five minutes, they had no time to waste.

Every Wednesday morning Mrs. Cummings brought her EMR class (Educable Mentally Retarded children) from San Gabriel on the bus to take gardening from Mrs. Woods. It was fun for me to help with this group of about fiftteen boys and girls. We planted, tended and harvested radishes, lettuce, cabbage, and other vegetables; set out annuals in the flower bed; planted bulbs; experimented with water sprinklers; learned how to prune roses from one of the regular Arboretum gardeners; pricked out seedlings; made divisions of *Sansevieria* for planters; learned lots of useful things.

During the spring semester two teachers brought their combined classes of emotionally handicapped children. I helped this group, too, because they simply needed another pair of hands.

After assisting and observing Mrs. Woods through one six-week session of Indoor Gardens Class for 6 and 7 year olds, I discovered that I *could* do it myself, after all! Six times through I've taught this series of classes in which the children learn, by actually doing it themselves, that there are many different ways to propagate plants. They plant a carton of succulents for a sun garden to take home, and a terrarium for shade plants. They gather and plant seeds which grow during the six weeks into trees to take home. They may have a chance to see the huge nest of the Black Australian swan and the tiny nest of the hummingbird, all in the same trip. Later, if they are lucky, they see the goslings and baby hummers. They may even learn about courtship from the peacocks.

We have "Friends and Enemies Day" when some children find out that the snail is an enemy of the garden even though it won't bite us; that spiders and salamanders are good, and snakes, too! Some children may never have touched a snake before, while others have had them as pets. But there are new experiences for everyone, and surprises for the teacher, too. We top off the last day with a half hour trip through the Arboretum's jungle. Do *you* know what makes a jungle different?

Summer classes begin on June 19th. I'm going to teach "Pot Gardening" to 8 and 9 year olds! Later I may even have a go at "Plot Gardening" with older children!

I'm hooked! Have been ever since the day Mrs. Woods passed out the speckled butter beans she'd soaked overnight, told the children to remove the thin seed coat, separate the cotyledons, and tell what they saw inside. Johnny Grey's clear, precise and surprised voice declared, "Why, there's a tiny little plant in mine!"

Kids deserve the chance to learn all they can about the natural world, and this world desperately needs kids who care enough to learn about it.

Hurrah for the Youth Section of the Arboretum! We'd like you to come, too!

Another Invitation to Foundation Members:

Increasing numbers of Foundation members are finding, as Mrs. Zabriskie has, a wide variety of stimulating opportunities for service at the Arboretum.

The recently organized official hostess group for the historical area, with a limited membership of twenty-five has already completed its training period. Each of its three divisions is now actively involved in the leading of tours, beautification of the historical landmarks, and assisting Mrs. Abigail Wyman with accessioning and cataloguing.

Now we're ready to launch a Children's Education Advisory Committee whose work will cover much that is described above, and vary from the purely advisory role right through to the teaching of children's classes with training provided on the spot. If you would like to devote some time to studying and working on this project, you are invited to apply for membership.

Name_____ Phone_____

Address_____

Send to: California Arboretum Foundation, Inc.

301 North Baldwin Avenue, Arcadia, California 91006.

Growing Notes

by GEORGE H. SPALDING

A recent phone call prompted this column. A lady's voice said, "I know this is not the best time to visit the Arboretum, but there will be something in bloom, won't there?" I assured her there was always something in bloom and then decided to make a tour of the grounds to see just what was in flower. Time was limited so the tour only covered the Australian section and a part of the South African section.

In the South African section, the Aloes were giving a fine account of themselves, as they had been for the last two or three months. There is at least one species, and usually several, for any size space in the garden. Many require a minimum of care and reward with a beautiful show of color, especially during the winter months.

The variety of bloom in the Australian section was surprising. Several of the Acacias were in their prime and others just at the end of blooming. *Eucalyptus orpettii* was just beginning to show full color. This fine small Eucalyptus is now coming into its own in the nurseries. Seedlings vary, of course, since it is a hybrid but practically all are good. *Eucalyptus caesia* is believed to be one of the parents and many of the plants have the beautiful bark so typical of *E. caesia*.

An old friend, *Grevillea Thelemanniana*. was on the verge of passing out of full bloom although there was still plenty of color. This beautiful, light and lacy appearing shrub has been in southern California for many years. It appears and disappears in the nurseries. There are two likely reasons for this, the first is that it is not an easy plant to hold over very long after the retailer obtains it from the grower: the second is that it will suddenly die in the garden after years of fine growth. When it dies, it is often practically overnight. The greatest problem for nurseries is watering. *G. Thelemanniana* requires perfect drainage in containers, and must not be overwatered. The Arboretum planting, which consists of several plants, has reached maturity. The clump is about four feet high and eight to ten feet through. It blooms freely and is a very worthwhile sight each year.

Two shrubby Cassias drew attention. One for the foliage and form, the other for the bright yellow flowers. *Cassia phyllodinea* is an attractive little shrub approximately 18 inches tall and 24 inches across. The phyllodia are grey, about two to three inches long and ¼ inch wide. The bush has a neat, rounded appearance. The second Cassia, *C. Sturtii* is six feet tall and at least as broad. It has a rather open, somewhat lax habit, the branches actually lying on the ground. The flowers are rich golden yellow and the shrub was just coming into bloom.

Dodonea viscosa and its variety *atropurpurea* are both widely planted in southern California. *Dodonea microzyga* is equally attractive and has the added advantage of very showy seed pods. The Arboretum planting contains a dozen specimens, all grown from seed.

There is variation in denseness of branching and excellent forms can be selected.

All were in heavy seed, and provided a beautiful show from some distance off. The foliage is a dark green which sets off the deep ruby fruits to perfection. The oldest plants of at least 12 years were beginning to show some dead wood, indicating that this shrub may not be too long-lived. However, all were in good health at this time. At this age the plants have reached maturity. There were all approximately four to five feet tall and as much as ten feet wide.

Eucaliptus orpettii

Grevillea Thelemanniana

Clianthus formusus (C. dampieri), the Sturt Pea is again putting on quite a show at the Arboretum. This is the second time field plantings have grown well and produced what can be considered fully developed plants, with good bloom.

The Sturt Pea *(Clianthus formosus)* is undoubtedly one of the most highly publicized of all Australian wildflowers, and justly so. It is spectacular in bloom and well worth the effort required to grow it well. It is native to a large area of Australia from the northeast coast of western Australia to the western plains of New South Wales. In the wild it appears after there have been rains. There may be some question as to whether it is an annual or perennial even though it is generally listed as a perennial in botanical records. The plants at the Arboretum have been annual, and that is probably the best way to treat it here. Seed is available commercially from Australia.

There appears to be no great difficulty in germinating Clianthus if the seeds are scarified before planting. The boiling water method is also good. Seed should be planted in a sandy mixture to assure good drainage and minimize danger of

damp-off. This is the major problem in getting seedlings to survive.

Once the seedlings are off and growing get them out into the ground as soon as they are large enough to survive under field conditions. Clianthus will grow in a variety of soils from sandy through heavy. Keep in mind that root rots are the most prevalent problems in the field and watering should be done very carefully in heavy soils.

Once out in the field do not be surprised if the original upright shoot or shoots die back as lateral shoots form. The strong laterals will grow quite rapidly to six or eight feet in length and lie flat on the ground. The leaves are silvery grey and the brilliant scarlet, pea-shaped flowers are borne in clusters on stems rising to a height of six to eight inches. Each flower has a jet-black spot in the center. Plants grown from commercially produced seed may show variations, such as having maroon centers instead of black. Other variations in color of flower have been reported from Australia. Once this beautiful plant is grown in quantity, it is very likely that many forms will be developed, as has been done with the California Poppy.

RECENT ARBORETUM LIBRARY ACQUISITIONS

Dumke, Glenn S. *The boom of the 80's in Southern California*. 313 pp. 1944. Huntington Library, San Marino, California.
Reprint of a classic southern California history covering the earlier part of the Lucky Baldwin era.

Gerhold, H. D. (editor) *Breeding pest-resistant trees*. 505 pp. 1966. Pergammon Press, N. Y.
A group of papers presented at the NATO and NSF Advanced Study Institute on forest tree relationships to insects and disease, held at Pennsylvania State University in 1964.

Kavaler, Lucy. *Mushrooms, molds and miracles*. 318 pp. 1965. John Day, N. Y.
Most readable and scientifically sound, this book for students and laymen, covers a botanical area of unexpected vastness and importance to mankind. The final chapter on "the search for life" is especially timely.

Kingdon-Ward, F. *Berried treasure*. 192 pp. 1954. Ward, Lock & Co. London.
A roundup, by families, of bright-berried plants, engagingly described by the explorer-author, with a view to culture and landscaping.

Knock, Florence. *Passifloras for your garden*. 100 pp. 1965. Diversity Books, Mo.
All about passion flowers, "the living legend," grown indoors and out, written by a minister's wife.

Reynolds, Gilbert Westacott. *The aloes of tropical Africa and Madagascar*. 537 pp. 1966. Aloes Book Fund, Swaziland.
Companion book to *The Aloes of South Africa*, this abundantly illustrated and descriptive work also includes some cultural notes.

Taylor, Geoffrey. *The Victorian flower garden*. 212 pp. 1952. Skeffington, London.
A popular history of the age in which the flower garden first gained preeminence; when the village, the chief social unit, blossomed with roses, hollyhocks, pansies and pinks.

1967 Coming Events

April 22, 23:	*Amaryllis Show*
April 29, 30:	*Iris Show*
May 7:	*Epiphyllum Show*
May 13, 14:	*Geranium Show*
May 26, 27, 28:	*Bonsai Exhibit*
June 24, 25:	*Gladiolus Show*
June 30, July 1, 2, 3, 4:	*Cactus and Succulent Show*
July 22, 23:	*Begonia Show*
October 28, 29:	*Fall Flower Show*

NOTE: For information covering exact times of events, entry regulations for exhibitors, sponsoring groups, etc., consult the Arboretum, 301 North Baldwin Avenue, Arcadia; telephone 446-8251.

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THE COVER

Our cover photograph shows the new Peacock Pavilion at the Los Angeles State and County Arboretum. For more about the Peacock Pavilion see page 43. *Photo by Charles Kassler.*

The Arboretum Viburnums

Ross Goodrich

Part I

These remarks are meant to serve as an introduction to the viburnums at the Los Angeles State and County Arboretum in Arcadia, California.

The collection includes specimens of viburnums that are commonly grown in the southern California area and many almost unknown here. There are somewhat more than fifty species and varieties that range from the entirely evergreen to the deciduous and from the attractively flowering to the almost non-blooming; from plants twenty-five feet high to those which get to only four or five feet in ten years. Some produce good berries after flowering while the greatest attraction of a few is in their fall color.

The plants discussed will be those seen as the best performers and since this is necessarily a personal observation it may overlook some very promising plants. However, it is a considered judgment to date. The viburnums will be grouped for comment into the large evergreen, the small evergreen, and the deciduous.

The locations of the plants in the Arboretum will be given in a general way, hopefully to guide those who would like to look them up. For the most part these plants are in the Park or Historical Area and the Asian Section. The greatest number will be found in the Asian Section, naturally enough, since more than half of the world's known 225 viburnums are from this part of the world. This area of the Arboretum contains several acres extending north from Tallac Knoll along Golden West Avenue, and then eastward around the Upper Lagoon to the Children's Education Building. Viburnums are most numerous in the center of this section. When the locations of specific viburnums are omitted from the text, that is where they will be found. In this section also are the North American viburnum species.

LARGE EVERGREEN VIBURNUMS

Viburnum tinus

Viburnum tinus is seen here in several forms: *V. tinus, V. tinus hirtulum, V. tinus purpureum,* and *V. tinus lucidum variegatum.* With the obvious exception of the latter, all are pretty much alike in general appearance but there have been slight differences in the rate of growth, size and texture of leaves, and fruiting habits. All look good the year around. The pinkish cast of the bud clusters and first blossoms gives way to white as the flower heads open. The blue metallic bead-like fruit of one year often stays on the plant through the blooming period of the next. One exception here is *V. tinus lucidum variegatum* which has not bloomed. Where some of *V. tinus* has had to be trimmed back for practical reasons, and a few times quite severely, they have generally fought back, bloomed anyway and also produced fruit. Several plants have been consistently attacked by mildew. Moving a couple of them to more open spaces where there was better circulation of air has not helped; this could be an innate susceptibility of some of the variations of this species, as none of the other viburnums at the Arboretum have been particularly affected by mildew. The plants of this group have been generally attractive and sturdy. These are all located in the middle of the Asian section, which, to the casual visitor means just off the paved road beyond the Pampas grass.

Viburnum rigidum

V. rigidum is located near the *V. tinus* group and it resembles them in general appearance but overshadows any one of them in both size of plant and leaf. It is a handsome bush of some fifteen feet in height, a little more stiff and upright in growth habit and more leathery in its foliage. To many observers the plant is more pleasing than *V. tinus*. Its blossoms are very attractive. They are pure white from the time they first open and have a mild fragrance. The flower heads are rounding, several inches across, very compact and have a fuzzy look. The blossoms open and cover the entire plant at one time, with the blooming period being a one-shot

affair compared to *V. tinus;* it lasts for only about a month. The fruits have been fewer than *V. tinus,* individually, and in the number of heads themselves, but of the same beautiful metallic blue. The leaves of the plant are slightly more convex than *V. tinus* and a bit more grayish, possibly because they are more hairy and therefore catch more dust. Its rate of growth seems to be faster than *V. tinus,* but it has developed no sloppy or spindling branches and it has not been attractive to aphis or mildew. It is a magnificent plant.

Viburnum rigidum

Viburnum odoratissimum Awabukii

Viburnum odoratissimum

This viburnum is commonly known as *V. japonicum,* but *V. japonicum* is quite distinct. It is represented here in the Asian Section by two groups of plants, each nearly fifteen years old. They are about twenty-five feet in height and would be about the same in breadth except for the closeness of their planting and the fact that they have been trimmed to allow for the passage of vehicles and foot traffic. For all this they still keep their generally rounded shape. Their height surprises

visitors accustomed to seeing them trimmed as hedges or as isolated bushes pruned small. These big plants have bloomed moderately and the flowers are reasonably attractive, but they come on generally at the height of the aphis season. The red berries that follow the bloom are not displayed in any great numbers and seldom have stayed on long enough to make much of a show. When pruned too severely they bloom little and have few berries, but they remain outstanding plants the year around.

At the edge of the road just north of the Arboretum Jungle there are three of these plants that also show what a mature shrub of this species can look like. Here, though in some shade from other shrubs and trees, they were still able to grow more than fifteen feet tall and twenty feet broad and keep their good shape and appearance.

Viburnum odoratissimum (upright growing variety)

Commonly known as Sweet Viburnum, it is represented here by a group of five handsome plants, fifteen years old and about twelve feet tall. They are uprightly branched and have a formal egg-on-end shape. They have grown so slowly and evenly that they have never been pruned. The leaves are dark green and glossy and though reportedly evergreen, a good many leaves drop off in our chilly Arcadia winters. This leaves the plants quite thinly foliaged for a time, though not quite bare. They have bloomed sparingly and not enough to justify the name of Sweet Viburnum, if this is what they were named for. These plants have a real charm and dignity — their fresh looking shiny leaves and even shape make them a very handsome plant.

Another group of these plants is along the old road north of the Carriage House in the Park Area and are easily seen here though they have to compete for attention with some large camellias and hollies. The tallest here is eighteen feet and it blooms well, which has not been at all characteristic of this particular selection of *V. odoratissimum;* the others in this group are fifteen to sixteen feet tall

Viburnum odoratissimum Awabukii

This viburnum has made an attempt to outdo the other *Viburnum odoratissimums.* It has grown faster and the leaves are a more brilliant, waxy, lighter green. It has bloomed more heavily than the others and has produced great heads of brilliant red berries in late summer. All of which adds up to a beautiful plant. But there is a price to pay for all this. It is more sensitive to heat and cold, burning

sooner in the hot spells and getting nipped earlier in the frosty season. It attracts more aphis and needs a little more attention as to pruning but through all of this it has still been rugged enough to maintain is beauty. Nearing ten years of age, these plants are about twenty feet tall. They are located between the groups of *V. odoratissum*.

Viburnum macrocephalum

The Chinese Snowball, *V. macrocephalum*, is an outstanding plant by almost any standard. Its globe-shaped flower heads are the size of hydrangeas, measuring eight inches across for the largest and five to six inches on the average. It is *almost* evergreen, has good color, is neat looking and as is apparently true with most viburnums, it is not demanding as to culture. The spectacular show of bloom comes on in early spring as the large white blossoms expand from apple green balls and almost cover the plant. It also produces quite a few "outlaw" blossoms off and on throughout the year, often as many as two dozen at a time. These are a bonus that never seems to interfere with the next year's bloom. This closely planted group of three in the Asian section is about twelve feet in height and fifteen feet broad and looks as if it is one bush. This height was reached in five or six years and now at ten years of age this appears to be the height at which they choose to stay.

The stems of this plant come up fairly straight as with most snowball viburnums, only taking on a slight curve under the weight of the blossoms. Though generally considered just semi-evergreen none of these plants has ever gone bare or even nearly so. The leaves become fairly dark green as summer comes on but rarely as dark as the *V. tinus*, and there is always a certain amount of new growth to keep the plant almost a spring-like, light green color.

The parent from which these plants were grown as cuttings is in the Park just east of the gravelled road between the Queen Anne Cottage and the Hugo Reid Adobe. This shaded location has not reduced the quantity nor quality of the blooms of the plant. Neither has it hurt its vitality, because the plant is very old. Mr. E. J. "Jack" Fawcett, grandnephew of Mr. E. J. "Lucky" Baldwin, says it was brought from the east by Baldwin in the 1880s. This would make it between seventy-five and eighty-five years of age, and until a few years ago this bush sported a cut-off center stump of more than four inches in diameter—a trunk that would have been large enough to support a considerable tree. This stump has since rotted away, and one wonders what the plant would have looked like when the stump was an active part of it; but after all these years it still has the shape and size of its offspring. It also has the same outstanding blooming habits.

Viburnum macrocephalum

Viburnum glomeratum

This is an attractive, almost evergreen viburnum of some six or seven feet in height with the graceful growth habit of the spiraeas. Its leaves are small, shiny, dark-green pointed ovals that stay on the plant until the new growth starts in the spring. At that time, when most of the old leaves drop, the foliage is a little sparse but not objectionably so. The almost white flower heads open in spring in a slow but steady progression, giving it a very long blooming period. It is a good sturdy plant, seeming to need little in the way of babying, and nothing in the way of pruning except to watch for the occasional layering of branch tips which might spoil the shape of the plant if left to grow. Occasionally a number of maturing leaves in the fall have turned a brilliant yellow, giving it another attractive period in its growth cycle.

Viburnum suspensum

In the Park or Historical Section of the Arboretum one of the prominent viburnums is an old favorite in southern California, *Viburnum suspensum*. the Sandankwa Viburnum. Several fine plants about twelve feet tall are located some little distance north of the Carriage House. They are on both sides of the road leading to the Queen Anne Cottage. They are quite old among local plantings of this species, and they give a good picture of what the species looks like at maturity. They are dependably attractive throughout the year, though not at their best during the blooming period when they are struggling through the annual aphis infestation.

Two groups of *V. suspensum* are also in the Asian Section. The planting in the northwest corner of the section has had to be pruned severely at times and these plants show what they will take in this respect. The planting just west of the Children's Education Building is an attractive example of what they look like when, for the most part, they have been able to develop their own shape.

Viburnum buddleifolium

This is a comfortable looking shrub of some seven to eight feet in height, round-shaped and gracefully branched. Its longish grey-green leaves are similar in shape to *V. rhytidophyllum* but are velvety looking and without deep creases. The flowers have an attractive pinkish cast, with the heads opening slowly. The blooming period is quite long and the blossoms are mildly fragrant. This particular

plant has been slow growing. It is ten years old and its present height is just under the maximum expected for this species. Slow growth can be an advantage in reducing the amount of pruning needed for a plant, but it is nice to have a shrub reach its expected size reasonably soon. This plant is in a type of soil that made it difficult to water sufficiently; this could account for its slow growth.

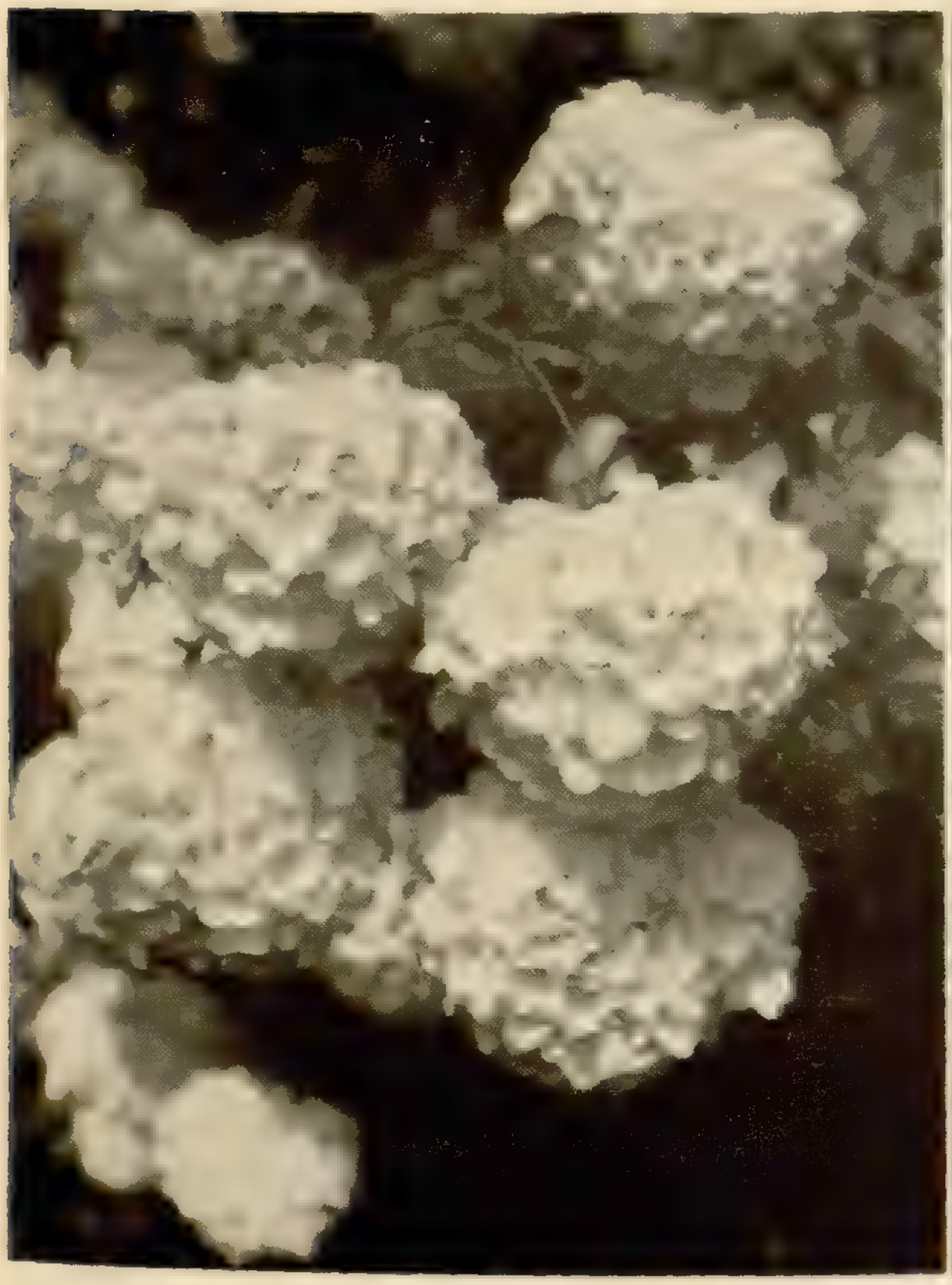
Viburnum buddleifolium

Viburnum rhytidophyllum

Just east of the Jungle area is a large *V. rhytidophyllum*. This plant is about twelve feet tall and as broad—a little larger than this species is expected to get. It is handsome and surely fits the common name of Leatherleaf Viburnum. Its leaves are very rough and leathery, growing up to ten inches long and mostly ovate lanceolate, but vary to being slightly broader, and quite convex. The plant is upright, thick and sturdy. The flower heads are held stiffly, the individual cymes that measure several inches across are not quite white and have a dullish, fuzzy

look, not out of character with the foliage. This specimen is in an area where the soil and drainage are not the best, but it has quite a bit of protection from the extremes of heat and wind and this may compensate for the poor soil factor.

For an example of this plant at an earlier stage of growth one can see a good medium-sized specimen just south of the Queen Anne Cottage; this plant is six feet tall. There is also a remarkably attractive planting in the Demonstration Garden just outside the Administration Building. This group is in very good soil and though in quite deep shade the plants bloom freely and retain the general characteristics of the species.



Viburnum macrocephalum

Viburnum buddleifolium

SMALLER EVERGREEN VIBURNUMS

Viburnum japonicum

This is the true *V. japonicum,* not to be confused with the *V. odoratissimum* commonly known as *V. japonicum*. This is a charming, fresh-looking little shrub of some six feet in height, with crinkly, light to medium green leaves. It has an upright habit for all its small size, with only the lower branches being recumbent. Its more or less triangular leaves vary from three inches long when they are at their most creased stage, to a length of six inches when they usually become a little smoother. In all their various sizes the leaves are moderately toothed on most of the upper half. As they mature they darken in color quite a bit. This viburnum has very fragrant blossoms, neither heady nor nauseating as with some overly sweet scents, but pleasantly suggesting lilacs or orange blossoms. It has been completely evergreen, to the delight of observers, and also to hordes of aphis that find a home beneath the leaves and on the flowers. They come in such numbers as to make one wonder if they cause the wrinkles in the leaves, attacking mainly the new growth. However, the aphis are easily controlled and for the most part disappear as summer comes on and give little trouble through the warmer months. There are two of these plants in the area, the mature one in the center of the section and a younger plant at the edge of the road by the drinking fountain.

Viburnum cinnamomifolium

Almost hidden away in the northwest corner of the Asian Section in the shade of a *Quercus robur* is a *V. cinnamomifolium*. It is a beautiful little shrub, round in shape, with dark green, broad but pointed three-veined leaves. This viburnum reportedly needs some protection from the sun and here it may have had too much protection; it has reached a height of only four feet in twelve years.

It is eventually supposed to become a small tree of some twenty feet in height, and its present rate of growth would suggest that it will reach this size about the turn of the century. *V. cinnamomifolium* blooms attractively although this specimen has yet to bloom. It is a very handsome shrub and if it did bloom at its present size it would be a a prize item for tub growing.

Viburnum atrocyaneum

Viburnum atrocyaneum is one of the most interesting of the smaller viburnums. The growth habit is graceful and the plant is attractive the year around, being completely evergreen and shedding no great amount of leaves at any one time. The smallish, sharply serrate leaves taper to a point from an oval shape and the foliage is a little stiff and dry looking to a very few critical observers. The leaves are usually a medium green and only in winter have sometimes been a little reddish. This plant is almost ten years old and yet only five feet in height. It is so slow growing that the pruning problem would have been nonexistent except for the fact that it sits between two larger shrubs that have forced it a bit out of shape at times. Its performance here suggests use as small individual shrub plantings, hedges, or for container growing. It has yet to bloom.

Viburnum propinquum

This is a beautiful, small viburnum. It has grown to only three and a half feet in almost ten years. Its three-veined, ovate-lanceolate leaves have three stages of color. The new growth is a bronzy red; next it turns to a light green; and then to a darker green which it stays for most of the year. The general effect is a medium green. Its slow growth would suggest a formal shape for the plant; it is not stiff looking at all, but informal and attractively so. It appears that this plant would do well in containers or small individual shrub plantings. It has bloomed year after year but this has been no particular blessing. The inflorescence is somewhat like Queen Anne's lace, small in size, greenish in color and attractive to many aphis. This stage passes quite soon, however, leaving no berries or fruit, and the plant returns again to its neat, pleasant appearance.

(Part II of this article will appear in the January, 1968 issue of Lasca Leaves)

ED
RIGHT

A Landmark Palm

by EDWARD PUGH

What may be the tallest living palm in the continental United States grows beside the Queen Anne Cottage at the Los Angeles State and County Arboretum. This princely tree is a *Washingtonia robusta,* the Mexican Fan Palm, which has reached a height of approximately 120 feet.

One of a large number of Mexican Fan Palms introduced by E. J. Baldwin to his Rancho Santa Anita during the 1880s and 1890s, this specimen takes its place among the older trees on the Arboretum grounds.

The first Mexican Fan Palm may have been brought to southern California as early as the eighteenth century by the mission fathers. The palm is indigenous to Lower California and Sonora, Mexico, and has done extremely well in southern California — where it has been extensively planted.

Although there may be some question as to whether the Arboretum's *Washingtonia robusta* is the tallest living palm in the United States — both Florida and Texas have made such claims — it is nevertheless a magnificent tree and one which has become an outstanding landmark at the Los Angeles State and County Arboretum.

Those Beneficial Insects

DR. HARRY G. WALKER

When the word insect is mentioned, most of us immediately think of a mosquito, a house fly or of some other pest, or of the tremendous losses that are caused annually by the injurious species. There are other insects, however, that are of great value to man, producing large quantities of valuable products such as silk, honey and beeswax, shellac, dyes and medicines. They serve as food for man himself and for many animals, especially birds and fishes. Further, they are of great value as pollinizers of many of our delicious fruits and vegetables.

In this article brief consideration will be given to their great value as predators (insects that kill and eat other insects) and, as parasites (live on or in other insects for a period of time when they may or may not kill them). No consideration will be given to those insects which attack man and other warm-blooded animals.

Metcalf, Flint and Metcalf in their book entitled *Destructive and Useful Insects,* make the following statement: "there can be no doubt that the greatest single factor in keeping plant-feeding insects from overwhelming the rest of the world is that they are fed upon by other insects."

Of the predators, the lady beetles (order: *Coleoptera;* family: *Coccinellidae*) are probably the most widely known and recognized as being beneficial. The adults are small hemispherical beetles ranging in color from light tan or yellow, to red or even black in color and may or may not have a number of small red or black dots on their backs. There are a great many different species of these insects and thus the wide variation in their size, coloration and appearance. They feed on a wide variety of aphids, scale insects and other soft-bodied insects and their eggs. Both the adults and the larvae (which are often overlooked or thought to be injurious) are beneficial. I remember that one of my first tasks as an entomologist was to

examine a field of tomatoes which the farmer reported was heavily infested with what appeared to him as small alligators. Close examination of the field revealed that the plants were covered with aphids, which the farmer had not seen, and that the small alligators were lady beetle larvae feeding on the aphids. It was necessary to show the farmer by the use of a hand lens how the lady beetle larvae were actually catching and killing the aphids before he would believe what was happening.

Another very common and beneficial group of insects in California are the lace wing flies (order: *Neuroptera;* family: *Chrysopidae*) or the aphid lions as the larvae are called. The active, spindle-shaped larvae are characterized by long sharp pointed jaws or mandibles that catch and hold their prey while they suck out the body fluids of their unwary victims. The larvae are sometimes confused with and taken for lady beetle larvae, even though they are normally more active and more slender than the lady beetle larvae. They feed especially on aphids and a wide variety of other small, soft-bodied insects and their eggs. The adults are soft-bodied, lacy winged insects often green in color. Many requests have been received at the Arboretum for information about their eggs which are deposited on the ends of tiny white threads, standing erect from leaves, twigs or other parts of plants on which they are deposited. It has been suggested that this habit protects the eggs from being eaten or destroyed by other insect predators.

Another common group of beneficial predators are the syrphid flies (order: *Diptera;* family: *Syrphidae*) whose maggot-like larvae feed on aphids. The adults often resemble bees except that they have only one pair of wings. The adults feed on nectar and pollen of many plants and may have real value as pollenizing agents.

There are many other predacious insects which may have great value in preventing or controlling outbreaks of injurious insects, such as the ground beetles (order: *Coleoptera;* family: *Carabidae*) both the adults and larvae of which often feed on cutworms, army worms, and other injurious pests; the dragon flies (order: *Odonata*) which feed on mosquitoes and other flying insects over or near water, while the larvae feed on various aquatic insects, small fish; the praying mantis (order: *Orthoptera;* sub-order: *Manteoidea*) which feed on a variety of insects. Still other groups of beneficial insects and related species are the robber flies (order: *Diptera*; family: *Asilidae*), spiders and predaceous mites. In fact, a colony of pesticide-resistant spider mites which was causing severe damage to experimental plants in one of the Arboretum greenhouses now seems to have been brought under control by predaceous mites.

The parasites range all the way from tiny wasps *(Hymenoptera)* that parasitize the eggs of caterpillars and other hosts to many large wasps and flies. One of these that is very abundant and has attracted a great deal of attention in the Arcadia area is a large black tachinid fly (order: *Diptera;* family: *Tachinidae*) that is parasitic on cutworms in the lawns. These large flies are about the size of the large green or blue-bottle flies and may be differentiated from them by the duller color and the large number of hairs on their abdomens. The flies may feed on nectar or pollen and are sometimes mistaken for honey bees as they hover over flowers searching for food.

However, they are most frequently noted as they flit about or hover low over lawns searching for cutworms to parasitize. A number of home owners have reported that their lawns were almost black with flies and not knowing of their beneficial nature have been attempting to kill them. In reality, these flies should be protected and welcomed, for they should be of real value in helping to rid lawns of destructive cutworms.

Other parasites that often attract attention are the tiny Hymenopterous wasps that parasitize aphids. These tiny wasps lay their eggs within the bodies of the aphids. The eggs hatch and the young wasps develop within the bodies of the aphids. As the wasps grow the bodies of the aphids swell up and become rounded and then usually turn brown. The wasps pupate within the body of the aphids. Upon reaching the adult stage the young wasps cut small circular holes through the abdomens of the aphids and emerge ready to mate and start a new life cycle.

Other types of wasp parasites that are frequently noticed are those that attack caterpillars. The wasps deposit their eggs in the bodies of the caterpillars, and many wasp larvae may develop in a single caterpillar. Upon becoming full grown the larvae cut a small hole through the body wall of the caterpillar and spin small white cocoons on the outside of the body in which they pupate. For example, tomato horn worms have been noted with more than fifty white parasite cocoons attached to their bodies. These parasitic cocoons are often mistaken or thought to be eggs of another insect. After a short rest period they change to adults and emerge to start a new life cycle.

At the present time, a great deal of effort is being spent by both the State and Federal governments to find new parasites and predators and to improve the effectiveness of the known species to control or to reduce the damage caused by the injurious insects. Gardeners and homeowners should welcome these beneficial insects — they do a great deal of good.

Growing Notes

GEORGE H. SPALDING

One of the major objectives of the Arboretum is the importing and testing of new plants, and the introduction of those found useful into the nursery trade. This sounds very simple but is sometimes anything but that.

During the past several years the Arboretum has offered a number of new plants to the trade. The results have been most disappointing. Under the state law authorizing the Arboretum to sell plants to nurseries it specifically states that the plants sold shall not now be generally available in the trade. We have not only followed this precept to the letter but have made it a practice to offer only enough plants per individual nursery to provide propagating stock, thereby enabling nurseries to develop an adequate quantity for sale within a reasonable time.

These appear to be two main reasons why this program has not produced the desired results. The first is that unfortunately too many of the nurseries obtaining stock just resell it without propagating new stock. The second is that because the plants are new and relatively untried, many nurseries have difficulty in selling them. In addition, they do not have the means to publicize these new items. It is rather like the chicken and the egg. The public doesn't know the plants (and in too many instances the nurseryman does not learn enough about the plant to be able to sell it) and is reluctant to buy; moreover, the nurseries—understandably—won't grow what they can't sell.

Part of the problem may be solved in the future now that *Sunset* magazine has indicated they will be pleased to cooperate in publicizing new plant introductions as they become available. They too have a problem in that the public becomes very discouraged when they read of a new plant in *Sunset* and then can't find it.

At any rate, the Arboretum will continue to introduce new and worthwhile plants and continue to hope that the nursery trade will accept and promote them.

A new plant closely related to Eucalyptus which will soon be introduced by the Arboretum is *Angophora subvelutina*. The Australian common name is Rusty Gum, indicating its close affinity to Eucalyptus. The trees in the Arboretum plantings are approximately 25 feet tall, rather columnar in form and literally covered with clusters of white flowers when in bloom. The foliage is evergreen, heart-shaped at the base and resembles Eucalyptus in many ways. It is a neat tree, tolerant of a variety of soils and should be suitable for the smaller property. Use it at some distance so that the form of the tree, texture of the bark, and flowers can be seen to best advantage. Its only drawback, if it can be called such, is the relative short period of bloom—a week to ten days.

Eucalyptus torquata, the Coral Gum, is available in many nurseries but is

Evergreen and covered with clusters of white flowers during blooming period, Angophora subvelutina *is an attractive tree suitable for the smaller property.*

seldom seen in gardens. This small, flowering Eucalytus is one of the very finest for small gardens. It blooms for as long as two months or more and is very colorful. It seldom reaches more than 15 feet in height, requires little care and is attractive in or out of flower. Color will vary in seedlings but nearly all are attractive. Range is from red through coral to pink.

Geijera parviflora, the Wilga of Australia, is one of the more promising new introductions of recent years. I am pleased to report that it is available in nurseries and is being used as a street tree in Santa Barbara. In general appearance one might think of weeping willow when looking at Geijera although the color is gray-green rather than yellow-green. In its young stages it is roundheaded and branches rather low on the trunk. It gives little shade which is typical of so many plants native to the drier regions of Australia. It is said to reach a height of at least 25 feet but the tallest seen so far were about 12-15 feet. It shows great promise as a street tree.

Arboretum's Peacock Pavilion Dedicated

The new Peacock Pavilion at the Los Angeles State and County Arboretum (pictured on this month's cover) is a happy example of what can be achieved by dedicated citizens working for the benefit of a public facility which operates on a limited budget.

The campaign to raise funds for the Peacock Pavilion was begun several years ago by the California Arboretum Foundation, Inc., the non-profit organization dedicated to aiding the development of the Arboretum through its publications, fund-raising, services, gifts and grants.

Enlisting the help of its more than 600 members and many other civic- and horticultural-minded citizens, the Foundation raised an initial $30,000, a sum sufficient to start the project. Another $10,000 was raised later to provide the furnishings, which include enough tables and chairs, decorated in peacock motif, to accommodate eighty-eight persons. A $45,000 grant from the County of Los Angeles completed the project, which was dedicated May 18, 1967.

The Pavilion is a circular, glass-walled building, situated on a slight rise, providing visitors with a panoramic view of the grounds and the nearby San Gabriel Mountains. For the present, vending machines will supply a variety of sandwiches, coffee, soft drinks, and desserts. Future plans call for hamburgers and other hot foods prepared to order.

The Pavilion provides the long-needed eating place where visitors can enjoy a light lunch and a rest between walking tours of the Arboretum's 127 acres. In addition, it provides a shop where visitors may obtain horticultural publications and gifts, as well as much-needed office space for the non-profit Foundation.

The new facility represents the culmination of the efforts of the California Arboretum Foundation, Inc., together with numerous individuals motivated by a deep interest in the Arboretum and a desire to improve it in every way.

Due to a number of requests for cultural information on the Acacia cardiophylla *which appeared on the cover of the January, 1967 issue of* LASCA LEAVES, *we are including that information below. We regret the omission of this information in the January issue.*

Acacia cardiophylla

Arboretum Introduction — 1961

Generic Name *Acacia cardiophylla* A. Cunn.

Family: Leguminosae.

Origin: New South Wales, Australia.

Form: A small tree to 12 feet or a large shrub to 8 feet.

Flower-heads: Golden-yellow, globular, to 3/16 inch in diameter, stalked, in axillary racemes, about 20-flowered, borne in great profusion in February.

Foliage: Evergreen, leaves compound, bipinnate, with 7 to 15 pairs of pinnae, to 1¼ inch wide, petioled, stipulate, with 2 small usually brownish stipules. Leaflets very numerous, ovate, entire, to 1/32 inch wide, glabrous or slightly pubescent above, pubescent beneath.

Growth Rate: Moderate to two feet per year.

Soil Requirement: Tolerant of a wide range of soils.

Exposure: Full sun.

Temperature Tolerance: 25°F. to 110°F. experienced at Arboretum; can possibly withstand greater extremes.

Water Needs: Once per month soaking during warm or hot periods.

Pruning: To remove deadwood and for shaping to grow as a tree or shrub.

Propagation: Seed will germinate in 13 days without any special treatment.

Remarks: If grown naturally with minimal pruning, this plant will form an excellent hedge with lacy branches arching gracefully outwards. With judicious pruning, plant makes an excellent specimen where branch structure can be shown off advantageously. Plant can also be trained to a single or multiple leaders to form a small tree.

This is one of the very first acacias to flower each year and adds a great deal of needed color to the grounds.

Book Reviews

Sunset Western Garden Book (New Edition), by the Editors of *Sunset* Magazine and Sunset Books; 448 pp.; Lane Magazine and Book Company, Menlo Park, California; $5.95.

Those who visit their nursery or bookstore in search of the "revised" edition of *Sunset's* well-known Garden Book are due for a pleasant surprise.

The new *Sunset Western Garden Book* is *really* new—a brand new format with up-to-date information; many more illustrations, charts, maps and diagrams; and about 40% more material. It is, for all practical purposes, a brand-new book, and should soon become as widely known and used as its famous predecessor.

A glance at the table of contents will reveal the breadth and scope of this new volume: more than 60 pages are devoted to a section entitled "How to Grow Plants." Herein is included much useful information—subjects such as soils, watering, fertilizers, pests and diseases, pruning, tools, propagation and lawns. The novice gardener or first-time homeowner should find this section invaluable; the experienced gardener can undoubtedly benefit from techniques and methods that will save him time, energy and money.

The "Plant Selection Guide," consisting of more than 160 pages and printed on green paper for quick reference, is crammed with information on *what* to plant and *where*. Whether your problem is how to disguise an ugly wall, bring fall color into your landscaping, create an erosion barrier, or provide plants that will attract birds to your yard, you are certain to find the solution here. In fact, the editors have anticipated and solved literally hundreds of common and uncommon Western garden ploblems faced by all of us at one time or another.

In the "Western Plant Encyclopedia" nearly 300 pages are devoted to describing more than 5,000 Western plants, all of which are designated with both botanical and common names, and many of which are illustrated with handsome line drawings. This section also contains a wealth of practical information on how, when and where to plant, and how to maintain specific plants for best growth and appearance.

In addition to the main reference sections are 24 detailed maps showing western climate zones, and a Gardener's Glossary of gardening terms frequently encountered.

For the Westerner who wants a complete, one-volume gardening reference book, the new *Sunset Western Garden Book* is highly recommended.

—D. D.

New Decorations with Pods, Cones and Leaves, by Eleanor Van Rensselaer. 199 pp. Illustrated. Bibliography and Index. D. Van Nostrand Company, Inc., Princeton, New Jersey. 1966. $6.95

More and merrier are the topics in this sequel to Mrs. Van Rensselaer's *Decorating with Pods and Cones.* A Christmas chapter extends from miniature trees and Della Robbia wreaths to a variety of holiday projects, some even lighted.

But holiday items comprise only a fraction of the suggestions offered. The use of recently available resin and plastic products makes possible many other constructions suitable for indoors or outdoors. House decorations include wall ornaments, lamp shades, bookends and a lovely daisy wall clock. Resin castings become beautiful flowers and leaves. Miniature compositions and centerpieces take new forms.

Many outdoor decorations such as screens and wall panels are described. Seashore materials are introduced in vases and in mobiles with their suspended glitter bits. Gift possibilities are unlimited.

Step-by-step instructions in this handy-sized volume are easy to follow. Both adults and children will find appropriate projects. Doug Morris' clear photographs, some in color, illustrate each design. An enlarged list of sources and supplies and a bibliography are included (collecting and preserving methods, and description of plant materials have been largely confined to the earlier volume).

The author stresses the sheer joy of handling nature materials, as well as the creative pleasure in using them. She says "nature is ever our inspiration — not to be copied, but to stimulate." This is a stimulating volume.

— LYDIA S. BOWEN

FALL FLOWER SHOW SCHEDULED

The annual Fall Flower Show will take place October 28 and 29, 1967 at the Arboretum, 301 North Baldwin Avenue, Arcadia. Information regarding times, entry regulations for exhibitors, sponsoring groups, etc., consult the Arboretum; telephone 446-8251. Plan now to attend!

RECENT ACQUISITIONS OF LASCA LIBRARY

Advances in Virus Research, Volume 12. 1967. Academic Press, N.Y.
A review for 1966 featuring virus serology, tissue culture, small bacteriophages, and other important topics.

Bainbridge, Richard (editor). *Light as an Ecological Factor*. London, 452 pp. 1966.
A symposium of the British Ecological Society of spring 1965 covering such varied subjects as forest light climates, radiation meterology, and submarine zonation.

Berrall, Julia S. *The Garden, an Illustrated History*.
388 pp. 1966. Viking Press, N.Y.
Lavishly illustrated and large, this history of the gardens of the world incorporates a concise and many-faceted text.

Bardi, P. M. *The Tropical Gardens of Burle Marx*. 160 pp. 1964. Reinhold, N.Y.
The drama of the tropics is caught by a landscape artist who blends science and art in his public and private gardens. The man as well as his work is studied.

Dakin, Susanna Bryant. *The Lives of William Hartnell*.
308 pp. 1949. Stanford University Press.
Another colorful Californian of eary times is brought to the present by the author of *The Scotch Paisano*.

Ellacombe, Henry N. *The Plant-lore and Garden-craft of Shakespeare*.
303 pp. 1878. William Pollard, Exeter, England.
A complete collection of Shakespeare's floral quotations augmented by a remarkable assemblage of plant facts, gathered by a botanist clergyman.

Scagel, Robert F. and associates. *An evolutionary survey of the plant kingdom*.
658 pp. 1965. Blackie & Son, London.
An excellently illustrated college text planned as a second year guide to further botanical exploration, from the University of British Columbia.

Voorhoeve, A. G. *Liberian High Forest Trees*. 416 pp. 1965. Centre for Agricultural Publications and Documentation, Wageningen, The Netherlands.
A scholarly, well-illustrated, descriptive work incorporating a detailed foliar key, forest ecology, and a record of economic uses.

— LYDIA BOWEN

IN MEMORIAM — W. DAN QUATTLEBAUM

The late Dan Quattlebaum was one of those rare individuals; happy and willing to do the things that are so important in life without a great deal of show—and often, without a great deal of deserved credit. His recent death leaves us all with a deep sense of loss.

I shall never forget the surprise of my first meeting with him when he very quietly asked if he could help by trying to eradicate the thistles which were then a major problem on the Arboretum grounds. The answer, of course, was yes—and Dan proceeded to do just that over a period of several years. Upon completing this task he set about removing the poison oak on the north slope of Tallac Knoll. And while finishing that project he had already begun to clear the lagoon of water hyacinths which had become a menace there.

His interest in birds was well known and he compiled and published at his own expense the first list of birds seen on the Arboretum grounds. The regular spring and fall bird walks were inaugurated by him and he led many of them for years.

Less well known was his interest in antique glass. He was most knowledgeable in the field and had acquired a very respectable collection.

When he no longer felt able to work on the grounds, Dan came regularly one day a week and cleaned seed at the Arboretum's plant records office. This continued until shortly before his passing.

Few organizations are privileged to be the recipients of such devoted service for so long a time. Those of us at the Arboretum who knew Dan will always remember him with gratitude and affection.

—GEORGE H. SPALDING

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OUR FIRST FIFTEEN-YEAR INDEX

This index to the first fifteen years of LASCA LEAVES which you now hold in your hands is the direct result of the inspiration and dedication of Mrs. Ross K. Boore, a member of the California Arboretum Foundation Editorial Committee and formerly Pasadena City Reference Librarian. Mrs. Boore has been ably assisted by Miss Lydia Bowen, Arboretum Staff Librarian and Dr. Leonid Enari, Arboretum Taxonomist.

Now, when you wish to know on what page Mr. Dan Quattlebaum is mentioned, or where there is information on flowering trees, or peacocks, or horticulture, or history; you can readily find it here.

We are fortunate in having a wide diversity of interests and talents among Foundation members who give so unstintingly of their time, as is the case in this instance with Mrs. Boore. To her, and to the others, we express our appreciation.

William S. Stewart

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IN THIS SPECIAL ISSUE

RANCHO SANTA ANITA

"Place of Many Waters"

By SUSANNA BRYANT DAKIN

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ABOUT THIS ISSUE

Rancho Santa Anita "Place of Many Waters" is a reissue (in slightly revised and expanded form) of the article by the late Susanna Bryant Dakin which appeared as Vol. VI, No. 3 LASCA LEAVES (Summer 1956).

THE COVER

The striking photograph of the Queen Anne Cottage at the Los Angeles State and County Arboretum was made by Mr. Glenn H. Hiatt.

RANCHO SANTA ANITA

"Place of Many Waters"

SUSANNA BRYANT DAKIN

Thousands of people have come from all over the world to live and work within the original boundaries of Rancho Santa Anita (called "Place of Many Waters" by the aborigines). They include scientists at the Los Angeles State and County Arboretum, scholars at the Huntington Library and Art Gallery, promising pupils at the Hugo Reid public school in Arcadia.

Such people may reside on tiny fragments of the Spanish land grant, but no boundaries of the mind are imposed upon them. To the history makers and recorders of this region, I dedicate my study of their land.

S. B. D.
Arcadia, California
July 15, 1956

Susanna Bryant Dakin

Susanna Bryant Dakin

Susanna Bryant Dakin (1905-1966) was widely and affectionately admired as one who did great good in a quiet way. Her talents were many and her writings on early California, including this article for LASCA LEAVES, reflect a fascination and a depth of perception which will long keep her memory alive.

Susanna Dakin brought an exceptional aura of California background to writings such as the *Scotch Paisano* and to the many works she accomplished in the Historical Preserve of the Los Angeles State and County Arboretum. Her father was a prominent Los Angeles surgeon who founded the Good Hope Clinic of the Hospital of the Good Samaritan. He was the hospital's chief of staff at one time. Her mother, Susanna Bixby Byant, the daughter of early rancher John W. Bixby, was the founder of the Arboretum's sister institution, the Rancho Santa Ana Botanic Garden for native plants in Claremont, California, of which Susanna was one of the directors.

Mrs. Dakin was one of the original group of dedicated workers who founded and guided the California Arboretum Foundation; and she served as chairman of both its Publications Committee and, with Mrs. John R. Mage, its Historical Committee. At the time of her death she was active as chairman of the Historical Study Committee of the Arboretum Foundation Board of Trustees. Another major interest was the Bancroft Library of the University of California.

In her collaboration with the late Maurice Block on the restoration of the Queen Anne Cottage, she enthusiastically shared his "stern sense of excellence." She mentioned that when they first saw this "Lucky" Baldwin Casino it was completely deteriorated — empty, vandalized, in need of paint, riddled by termites, with the tower about to collapse. The thoughtful, imaginative interpretation which resulted from the cooperation of these two gifted artists will yield continuing delight for all who come this way. Her untiring efforts were also directed toward the remarkably authentic restoration of the Hugo Reid Adobe and the Baldwin Carriage House.

This charmed life came to a tragic end when the plane in which she and her family were traveling to Baja California to spend the Christmas holidays crashed on a lonely shore of the Sea of Cortez on December 20, 1966. Susanna Dakin's wish that her children might "Gain impetus from the past to pioneer the future," as expressed in the dedication of one of her books, is relevant to all who share her intense interest in California history.

MARIA STEWART

Part One
THE PLACE

SINCE REMOTE TIME, visitors have marveled at a homesite blooming perennially in arid, southern California country. First to come upon this wonder were the Indians. of Shoshonean stock and tradition, who roamed the region for centuries before Spanish occupation. They gaily decked their nakedness with flowers and fished the spring-fed lake. A settlement grew alongside, which they named *Aleup-kig-na*, "Place of Many Waters."

The Indian homes were low round huts *(jacales)* built of bent oak branches and woven *tule* reeds from the water's edge. Through the years, discoveries of arrow-heads, pestles, pots and baskets, cold-weather and ceremonial clothing, shell orna-ments and shell money, human and animal bones—all these have aided in authentic re-creation of a vanished, carefree way of life.

The limited Indian population had a plentiful supply of food. Fish abounded in the lake, and birds in the reeds and bushes. The Indians also ate a variety of snakes and animals—excluding only the rattler and the bear (whose black body was feared to contain a wizard's soul). Grasshopper roasted on a stick was considered a delicacy.

Everything grew wild and needed no tending. Besides the reeds and grasses used for weaving, local trees and plants provided edible acorns, mountain cherries, chía (a blue-flowered sage from which nutritious mush was made), roots, berries and fruit. Soap came from a star-flowered marsh plant *(Chlorogalum pomeridianum)*.

Certain plants were thought to have healing properties. A local medicine man would have prescribed wild tobacco pills to cure fever, whipping with branches of nettle and drinking the juice of *Datura meteloides* (Jimson weed) for paralysis. Rheumatism received a heat cure through the application of pressed dry nettle fuzz, set on fire—like spunk. Lime pounded up with wild tobacco was eaten to clean out the stomach and bladder. "Purification" after child-birth included lying on hot rocks in a sweat house.

Hugo Reid, a pioneer anthropologist and a Scotsman who was to play an important part in the history of Rancho Santa Anita, concluded that "in regard to the diseases then prevalent, inasmuch as syphilis was unknown, brandy and its associates unused, and high living at low ebb, their nosology was very limited." Due to diet (everything was unrefined and eaten cold) "they carried their teeth perfect to the grave."

The Scot, informed by his Indian wife, was first to reveal facets of Indian life completely unknown to the conqueror race. Far from being stupid, dirty "diggers" fitted only for servitude, these Shoshones once had an advanced system

of government, an imaginative mythology and belief in a Deity so sacred that His name never was mentioned aloud, a spoken language with *nuances*—though no literature. The so-called "court" language and traditions came down through the generations by word of mouth. Elders were venerated for their memories and store of knowledge. Hugo Reid mastered the language and talked to many of the "old ones", recording conversations over a twenty-year period (from his first visit

Yang-na, an Indian village of the Los Angeles region, but the exact site is unknown. mention of visiting this village is found in the diary of Father Crespi—(Yang-na, as reconstructed by this drawing from The Yang-na Indians, School Publication No. 420 shown through courtesy of Los Angeles City School District and Mr. W. W. Robinson.)

to California in 1832 to the year of his death, 1852).

In the old days, trade was carried on with neighboring tribes, and warfare seemed almost unknown. But they all possessed weapons, for hunting, and it is difficult to see why these aborigines—living the unpressured life of natural man in a productive land—should have yielded without a struggle to Spanish conquest. They far out-numbered the first white men to reach California. Perhaps the appealing piety and intrepid character of the "founding fathers" convinced them of the need to change their ways. Hugo Reid, a sceptic, wrote an account of the Indian "conversion" that the Church banned for many years (16).[1]

More than two hundred years after discovery by Spanish explorers, Alta California was colonized for the King of Spain by members of the Franciscan order traveling afoot and unarmed through hundreds of wilderness miles along the coast.

[1]Numbers in parenthesis refer to the Bibliography. Available in California libraries are books, published articles or manuscripts written either by or about individual owners of Rancho Santa Anita. Each happened to be an extraordinary man, symbolizing the successive eras in California history.

The intent of these gray-robed, sandalled priests—carrying no more than meager provisions, some seeds and tools—was two-fold: to save the Indians' souls and with their labor to start the string of twenty-one coastal missions that would stretch, eventually, from San Diego in the south to San Rafael, above San Francisco Bay.

Spanish soldiery and other colonists arrived by land and sea to aid the *padres*, whose planning contained elements that were military, political and economic, as well as religious. Presidios and pueblos sprang up in mission neighborhoods, like *el Pueblo de la Reina de los Angeles* not far from *la Misión de San Gabriel*.

Following the establishment of San Gabriel (to become "Queen of the Missions") in 1771, a vast acreage was claimed by the Church to sustain the many converts. The fertile "Place of Many Waters" came under ecclesiastical jurisdiction as the mission *rancho* called Santa Anita. Persuaded by priests, prodded by soldiers, the Indians burned their own homes at *Aleup-kig-na* and elsewhere in the region. They exchanged their freedom for the complete care of body and soul offered under the Franciscan system. Great numbers came to live in dormitories (called *monjorios*) within the mission walls. With unending labor, they carried out the great design.

JUAN CRESPI — SPLENDID WAYFARER

Father Juan Crespi belonged to that small company of "splendid wayfarers" — missionary explorers who penetrated the world's wilderness in attempts to spread the Christian faith beyond safe, established boundaries. Through the centuries they recorded what they saw and did; and of all the diaries in church archives, none are better written nor more informative than Crespi's (4).

The missionary fervor of this gentle, kindly *padre* spirited him from a comfortable home in Mallorca across the ocean to Mexico, in company with Junipero Serra, across the North American Continent and up the entire length of the Californias—often afoot and alone, always unarmed. Crespi was asked by Serra, *el padre presidente*, to record the historic Portolá expedition, seeking mission sites for the Franciscan order in Alta California — 1769-70.

Crespi wrote of a free and happy people living on a generous land, and knowing how to use its gifts for food and medicine, clothing and shelter. Only their spirtual state perturbed him and this — he was convinced — would be elevated by embrace of the Christian, Catholic religion. Crespi himself had been a pupil of Father Junipero Serra, and for many years his close companion. From Serra he inherited a burning, blazing faith to light the way. He longed to share it with even the humblest heathen, in the furthermost wilderness.

The San Gabriel Valley he saw with dawn-struck eyes on Sunday, July 30, 1769. From a camp site in the Puente hills his party entered "A valley of very large live oaks and sycamores." He recorded, "We then descended to a broad and spacious plain of fine black earth, with much grass, although we found it burned. After travelling for an hour through the valley we came to an arroyo of water which flows among many green marshes, their banks covered with willow and grapes, blackberries and innumerable Castilian rosebushes loaded with roses.[2]

[2]The wild roses of California reminded Father Crespi of Spanish natives. He was the first of many to call them "castilian."

In the midst of the verdure runs a good channel of water which when measured was found to have a volume of three quarters of a square yard. It runs along the foot of the mountains, and can easily be used to irrigate the large area of good land that the valley has. The valley has a length from north to south of about three leagues, and is surrounded by ranges of hills. The one to the north is very high and dark and has many corrugations, and seems to run farther to the west. The others are not so high and they run from east to west. The plain must be about six leagues long. We camped near the arroyo of running water, whose banks were covered with watercress of which we ate."

The Indians of *Aleup-kig-na* may have used canoes fashioned from tules as in this early photograph.

When Father Crespi came, a few miles further on, to the Indians' "Place of Many Waters," he showed a concept of geology in explaining the water that he found there — at the base of the Sierra Madre mountain range, twenty miles away from the Pacific Ocean. Through friction, eons ago, earth stirrings commenced to form an underground basin in crystalline rock, of great depth and extent. There, water from rain and melting snow is retained indefinitely and comes to the surface at certain spots, like *Aleup-kig-na,* the ancient homesite of Rancho Santa Anita.

The local Indians believed that subterranean activities, whose significance they dimly comprehended, were caused by the stirrings — in sleep or anger — of seven giants who held the world upon their shoulders. The even more thrilling geological story of the region has been revealed by scientists at California Institute of Technology.[3]

Because of terrifying, frequent earthquakes the name *Temblores* was given to the *arroyo* of running water mentioned in Crespi's diary, and to the mission first established on its bank. Later both river and mission were dedicated to San Gabriel. But the so-called "Old Mission" actually fell down in an earthquake, and had to be rebuilt at a distance — in the present townsite of San Gabriel.

Of the aborigines, who met the first Spaniards with gifts — baskets of food and strings of shells — Crespi wrote: "All this land is populated with a large number of Indians who are very gentle, generous and well-formed." He described their appearance as he first saw them — before they had been reduced, as mission neophytes, to servile anonymity in straight, coarse *xergas:*

"The women were modestly covered, wearing in front an apron of threads woven together which came to the knees, and a deerskin behind. To cover the breasts they wear little capes made of hare and rabbit skins of which they make strips and twist them like rope. They sew these strips together, to protect them from cold as well as for covering for modesty's sake. Most of the women go clothed in the same manner, but all of the men go as naked as Adam in Paradise before he sinned, and they did not feel tht least shame in presenting themselves before us, nor did they make any movement to cover themselves, just as though the clothing given them by nature were some fine garment."

QUEEN OF THE MISSIONS

Tremendous tasks lay before the Franciscans who would build a mission community in an earthquake-ridden wilderness, the natural haunt of a pagan people. But by 1829, when Alfred Robinson spent a few days in the San Gabriel, the place buzzed like a giant hive with a myriad of activities conceived by the priests and carried out by their converts.

Robinson was a Bostonian, rather stiff in bearing and formal in attire, who traveled for several years up and down Alta California as resident agent for the Boston trading firm, Bryant and Sturgis. His recollections of those years became the celebrated *Life in California,* reprinted many times in several languages (17). He recalls the visit to San Gabriel and to Santa Anita, the mission *rancho:*

"It was Saturday evening and as we approached the buildings of the Mission, the chapel bells tolled the hour for prayer. Hundreds of Indians were kneeling upon the ground, and as the tolling ceased, they slowly rose to retire, and a merry peal announced the coming of the Sabbath.

"The director of San Gabriel was Father José Sánchez, who for many years

[3]The study was initiated by the late Dr. John Buwalda.

had controlled the establishment which, through his management, had advanced to its present flourishing condition. Possessing a kind, generous and lively disposition, he had acquired, in consequence, a multitude of friends, who constantly flocked around him; whilst through his liberality the needy wanderer, of whatever nation or creed, found a home and protection in the Mission.

"In the morning, at six o'clock, we went to the church where the priest had already commenced the service of the mass. The imposing ceremony, glittering ornaments and illuminated walls, were well adapted to captivate the simple mind of the Indian, and I could not but admire the apparent devotion of the multitude, who seemed absorbed, heart and soul, in the scene before them. The solemn music of the mass was well selected, and the Indian voices accorded harmoniously with the flutes and violins that accompanied them . . .

"There are several extensive gardens attached to this Mission, where may be found oranges, citrons, limes, apples, pears, peaches, pomegranates, figs and grapes in abundance. From the latter they make yearly from four to six hundred barrels of wine, and two hundred of brandy; the sale of which produces an income of more than twelve thousand dollars. The storehouse and granaries are kept well supplied, and the corridor in the square is usually heaped up with piles of hides and tallow. Besides the resources of the vineyard, the Mission derives considerable revenue from the sale of grain; and the weekly slaughter of cattle produces a sufficient sum for clothing and supporting the Indians.

"The two 'ranchos' of St. Bernardino and Sta. Anita are included in the possessions of the Mission; the former of these has been assigned by the padres for the sole purpose of domesticating cattle, and is located some leagues distant, in a secluded valley among the mountains; the latter is for cultivation, and is one of the fairy spots to be met with so often in California. On the declivity of a hill is erected a molino, or gristmill, surrounded with fruit trees and flowers. A beautiful lake lies calm and unruffled in front, and all around fresh streams are gushing from the earth, and scattering their waters in every direction. It would be a magnificent spot for a summer retreat, and much reminded me of many of the beautiful locations to be met with in the vicinity of Boston.

"The Mission of St. Gabriel was founded in the year 1771, and its population, including the two ranchos before mentioned, now numbered from twelve to fifteen hundred. It was thought at one time to possess from eighty to over a hundred thousand head of cattle, besides horses, mules, and sheep, in countless numbers which run at large. No advantage is derived from them beyond the value of their hides and tallow, and thus thousands of dollars are yearly left to perish on the field . . .

"Speaking of the rich character of the valley of San Gabriel, the author would say that years subsequently [after the Secularization Act was passed, in 1833, taking all temporal control from the mission padres] the good old Father urged him to petition the government for the possession of the Santa Anita Rancho, located in the very heart of this valley, which he could easily have obtained gratis, had he deemed it expedient to do so, as it only required the consent of the presiding

missionary, with that of the territorial governor, to have obtained it. The author, having no idea of remaining in the country, had no desire for it. The same property now would be worth millions of dollars to him."

DOÑA VICTORIA REID

It was a triumph for the Franciscans when the Comicrabits, family of chieftains, came to live within the mission walls at San Gabriel. According to custom each Indian convert received a Christian name, and the small girl among them became Bartoloméa to the padres. Twenty years later, upon marrying a British subject, she took the name of Victoria, the young girl then being crowned Queen of the British Empire. Ever after, Hugo Reid's wife was known as "Doña Victoria" to the *vecinos* who revered her for aristocratic grace, medical skill and unbounded hospitality.

A beautiful Indian's enduring romance with a handsome, educated Scot provided Helen Hunt Jackson with source material for "Ramona" — the best-selling novel which in the 1880s aroused almost as much sympathy for the abused red race as had "Uncle Tom's Cabin" for negro slaves before the Civil War.

Doña Victoria's knowledge of her people, elicited and recorded through the years by an understanding husband, was used with telling effect and full acknowledgement by a friend and neighbor named Benjamin Davis Wilson, a native of Tennessee.

"Don Benito," who entered California in 1841 as a trapper with the Workman party from New Mexico, acted as first United States Indian Agent in the territory. He wrote a humane report in '52, attempting to interest President Fillmore in long-needed regulation of Indian affairs, and outlining a long-range program.

After the Secularization Act ended paternalism in the missions, providing for lay administration, the Indian neophytes fared very badly — ridden and decimated by the white men's diseases, no longer protected by the *padres*, exploited as personal servants, deprived of ancestral lands — even though the Act allowed for distribution of land and livestock to each converted Indian.

Doña Victoria was one of the few Indians ever to own land as an individual. To her Scottish husband she brought a dowry of San Gabriel mission land acquired in appreciation of early, housekeeping services to the *padres*. This was known as "Huerta de Cuati" ["Orchard of the Twins"] and later acquired by "Don Benito" Wilson (21), who changed the name to "Lake Vineyard."

In successive decades, "Don Benito" went on from his poorly-paid government job as Indian Agent to become a leading orchardist, vineyardist and vintner in Southern California. Also he made a great deal of money in real estate and received many honors — being elected State Senator, becoming a founding member of the San Gabriel school board, and serving as director in oil, telegraph and railroad companies.

He participated in successful development in the area, and had a mountain

Don Benito Wilson built a home in the San Gabriel Valley on a site which is now a part of the city of San Marino—(Reproduced by permission of The Huntington Library.)

named after him — with a famous observatory built upon it. But in 1877, when interviewed by historian Bancroft as a pioneer prominent in all these fields, Wilson's one request was that he be recorded as "a friend of the Indians and credited with urging their settlement on reservations."

After marriage to Hugo Reid, Doña Victoria did not occupy her orchard property (a westerly portion of the original Rancho Santa Anita). Nor did she ever live there with her first, Indian husband — christened Pablo María — who died of smallpox in 1836 or early '37. Twenty years her senior, he was a superior individual of aristocratic lineage who managed the large San Pasqual ranch for an old lady named Doña Eulalia Pérez. After his death, the young widow lived on, with her children, as a ward of Doña Eulalia. Indeed the week-long celebration of her second wedding took place at San Pasqual (the present site of Pasadena).

To many people's astonishment, the young Scot adopted his wife's Indian children as his own. According to extant mission records, they were four in number, named Felipe, José Dolores, María Ygnacio (to become known as the "Flower of San Gabriel") (12) and the baby, Carlitos. The little Indians received an education rare in early California, first from their step-father and then the older boys went on to William Hartnell's pioneer *colegio* (5b) in Monterey.

The Reid's first home was a two-story *adobe* in San Gabriel near the mission, built Monterey-style. The mud-brick construction was strengthened by heavy timbers cut and hauled from the forests of San Bernardino; the roof was shingled, as was rare in southern California. The Scot used the upper floor (where his wife never would go, for fear of earthquakes) for a schoolroom and library. Here he kept books, including a set of Shakespeare and Byron's poems; newspapers and magazines sent by far-away friends, ranging from "London Punch" to the "Polynesian" published in Sandwich.[4] Red *chile* peppers drying on the rafters, and clusters of Indian corn added color to the large room.

There were daily lessons in French, English, Spanish, arithmetic and geography. Don Hugo, a born and experienced teacher, took keen pleasure in giving them. He was a linguist, a skilled accountant, and the geography lessons were thrilling reviews of his own adventures. They served as an outlet for the old wanderlust that had been stemmed by marriage. The children listened, wide-eyed, and went at their studies with fervor.

In the dusty twilight of the attic, their step-father revealed to them the sesamic quality of education. As a result, they did not rebel at the drudgery of learning grammar rules and how to spell hard words.

Doña Victoria, for whom reading and writing were against nature, used all her ingenuity to find distractions for the young ones. She feared that too much indoor application would ruin their health. Gardening, fancy work and teaching household skills to Indian servants occupied her time — when there was no entertaining to be done.

Within a year after Hugo's marriage, William Heath Davis came from San Francisco to San Gabriel on a business trip, and stayed with the Reid family. Of course he had been offered hospitality of the home for as long as he liked, by an old friend. This was the custom in a country without hotels. But Davis accepted Reid's invitation doubtfully — fearing, like many others, that the Scot had become a typical "squaw man," that he would find himself in a brush *jacal* or at best a two-room *adobe* swarming with *pulgas* (fleas) and dark, dirty little "diggers." Instead, following directions with a companion, he drew rein at a two-story home rivalling that belonging to the United States Consul, Thomas Larkin in Monterey, and found "old Reid" living happily and luxuriously with a companionable wife dressed Castilian-style, like the "Scotch Paisano" himself.

Standing in the doorway, they made a striking pair — both above middle height and each the flowering of a race. The Anglo-Saxon was ruddy blonde with the deep blue eyes of a sea-captain; the Indian more mysterious in appearance, with crow-black hair and large dark eyes somber in repose but lighted now with welcome for her husband's friends.

The visitors were "surprised and delighted with the excellence and neatness of the housekeeping of the Indian wife, which could not have been excelled. The beds which were furnished us to sleep upon were exquisitely neat, with coverlids of satin, the sheets and pillowcases trimmed with lace and highly ornamented."

[4]As the Hawaiian Islands then were called.

(From the ancient Doña Eulalia Pérez she had learned the European arts of lace-making and embroidery.) Treasures from Don Hugo's travels mingled harmoniously with Doña Victoria's furnishings: her conventional Spanish furniture, religious pictures and images, lace curtains — still favored by the privileged class in the late 1830s, long after the military conquest by Spain. The Indian children they found strikingly handsome, well-dressed and well-mannered.

William Heath Davis, in a widely read book (6b), revealed much about the Reid's married life. He not only described Doña Victoria's household as he found it on visits both to San Gabriel and, later, to Rancho Santa Anita, but went on to say in general that, "the Indian women of California are far better stock than those of Mexico, which accounts in a measure for their finer children." To Reid's wife he attributed unusual (but not unheard-of) beauty and grace, besides housewifely skills, saying, "there are similar instances of this kind, with other Indian wives I could mention, who have been tutored and raised by Castilian [foster] mothers," like Doña Eulalia.

By the time Hugo Reid, advised by the *padres,* commenced petitioning for Rancho Santa Anita, there were several other claimants. Assured of eventual ownership, the Scot took a chance and made improvements calculated to strengthen his own claim. On January 27, 1840, he wrote to his good friend William Hartnell, *Visitador de Misiones* by appointment of Governor Alvarado:

"Bandini (2b) (through your kindness) having given me the necessary possession of Santa Anita, I immediately made corrals and a *jacal* for the present, until the rains are over. I have sown 10 *fanegas* of wheat — cleared ground to put in a vineyard of 10,000 vines and 1000 fruit trees. I have put on the farm . . . 62 mares and in April intend putting on my stock of cattle.

"This I consider doing more than the López family would do in fifty years, notwithstanding that your uncle D. José Antonio Carrillo has made out new representations for them and intends pleading for them with the governor . . . I have built a new house in the mission [*rancho*], flat roof'd and corridor'd. Certainly government will never be so blind to take away land from one anxious for the progress of the country, to give to another who has neither a just claim, means, or yet will do anything."

The case dragged along for more than a year before Reid went to Monterey, then capital of Alta California, in April '41, and secured a decisive grant from the Governor. Wryly the Scot wrote to "Don Abel" Stearns (2b) who, somehow, had accumulated more land than any other man in California:

"His Excellency has attended to the papers of my ranch in the same manner in which I would dispose of a dish of lima beans for breakfast — fattening myself in so-doing."

As Reid had written to Hartnell, the ranchhouse that he designed and built on the homesite at Santa Anita was "flat roof'd and corridor'd" — Los Angeles style. Black pitch for the roof, called *brea,* came from treacherous oil pits west of the Pueblo (since ancient times a trap for man, bird and beast). *Adobe* bricks were made and sun-dried on the ranch by Indians experienced in mission buildings. Some

of the same ones had helped, a few years earlier, to build the more pretentious San Gabriel house called *Uva Espina,* in which the family continued to live. Often the Reids rode or drove in a *carreta*[5] to Santa Anita — sometimes bringing *padres* or other friends to advise on construction problems.

The new, low house (one-story out of deference to Doña Victoria's fear of earthquakes) was L-shaped, placed on an eminence overlooking the San Gabriel valley on the south and in view of the Sierra Madre mountains. The garden planting grew luxuriantly.

The children, most of all, loved the Santa Anita — for the fish, easy to catch in the lake; the birds nesting in the *tules* and water grasses; the wild grapevines festooning the trees and forming hiding-places; the horses to pet and ride.

Running the ranch entailed seasonal activities such as *siembra,* or the sowing of wheat and corn in December; harvest from July to September; irrigating and picking at various times; grape gathering and wine-making — Don Hugo's main interest as a *ranchero;* then the great *rodeo,* or roundup of cattle in April, and smaller ones throughout the year for *la matanza* (slaughtering), doctoring, dehorning or branding. Of course there were intermittent activities like hide curing, garden fencing, gopher killing, adobe repair and whitewashing after heavy rain. Indian laborers lived as they used to, with their families in *jacales* near the lake, and an old mill built by the *padres* was repaired and used.

With so much to do at Santa Anita — and a nice new house to stay in — the Reids spent increasing time at the ranch. When William Heath Davis came again (in November 1843) with a business associate and fellow countryman of Don Hugo's named James McKinley, he found the whole family living there in lavish style. His description of meals served at Santa Anita is mouthwatering (6b):

"During our stay as guests at Santa Anita, we feasted daily on good food. For breakfast we had honey (the production of the land, and in fact everything we ate was), fresh eggs from the poultry yard, which was well stocked with chickens, ducks, geese and turkeys; coffee, with rich cream; chocolate and tea; 'chino beans' (curley beans), which looked like scrambled eggs, especially for breakfast; *tortillas* made of flour or corn; but no butter, strange to say, with hundreds of cows on the place, but however this was characteristic of the *ranchos* at that season of the year. This composed the first meal of the day. The cloth was neat, and the furniture of the table exquisitely clean.

"As the house clock sounded the noon hour the visitors were summoned by a maid servant to the dining room for a midday meal, which was a solid meal of beef steak with and without onions, broiled beef, stewed chickens, or hash made of *carne seca* (dried beef) with scrambled eggs mixed, seasoned with onions, tomatoes, and a sprinkling of red pepper (this dish was very palatable), beans prepared with plenty of gravy, the water from which it was boiled preparatory for the frying pan, and seasoning; homemade bread, California wine, and finished with black coffee. This noon repast could not be excelled in respect to neatness and in preparation of the food.

[5]According to custom, the Reid *carreta* probably was upholstered in calico and quite comfortable. But, fundamentally, it was a large creaking cart with solid wood wheels, drawn by a pair of oxen, similar to those used in transporting mission produce to the nearest seaport.

"The dinner consisted of chicken soup, roast ducks, *guisado de carne* richly flavored. sweet potatoes grown on the land, *frijóles*, chicken salad, and lettuce. This fine dinner was served with old wine of the make of the Mission of San Gabriel, and custard and pies and coffee.

"During our stay of nearly two months, we were well fed, the meals varying but little from day to day in the makeup of the viands. On Sundays for dinner a turkey this week, roast geese for the next, and for the third Sunday roast ducks, and so on to the end of our sojourn, and we regretted when the day of our departure had arrived, which was the day succeeding the festivals of Christmas, the birth of our Saviour.

"These festivals were prepared in grand style, with all the nice things for the celebration of such happy occasion . . . The turkeys had been fattened for more than a month previously, with walnuts whole with the shells on pushed down the throats of the mutinous birds as part of their food, the flavor of which is still on my palate, or the remembrance of it. There were many invited guests who contributed largely to the enjoyment of the occasion, and dancing prevailed after the sun had appeared above the peaks of the lofty mountains . . .

"Both Reid and his wife were epicures, and they had everything (their own

A portion of the Arboretum's Historical Preserve as it appears today: in the foreground is a reconstructed corral and several Indian wickiups; behind is the restored adobe home of Hugo Reid.

The interior of the Hugo Reid Adobe has been furnished in a style characteristic of the early California period.

market place on the *hacienda*) to entertain visitors sumptuously. Doña Victoria had a fine Indian cook who had been educated in the art at the Mission of San Gabriel. though the lady herself superintended more or less in the preparation of our good living.

"James McKinley and Reid our host were both from Scotland and from the same town, and knew each other in the Old Country; hence the great kindness bestowed on the former, and to me as his friend, by Don Hugo and Doña Victoria. Hugo Reid was the grantee . . . of the Santa Anita *rancho* . . . It was then the most picturesque spot of Southern California, with mountains, valleys, springs and running silvery streams. You would observe in riding over the *rancho* its having more than its *pro rata* of towering and overspreading liveoak trees, manzanita. laurel and other forest in comparison with other *ranchos*.

"Reid was a cultivated and educated man, a big-hearted man, a thorough accountant and bred as a merchant in his own country . . . The hospitality shown to McKinley and myself, not only by Reid himself but by his Indian wife, was sumptuous. A Castilian lady of standing could not have bestowed on us any greater attention or graciousness than was extended to us as I have described at the 'Santa Anita'."

THE DIBBLEE LETTERS

More than a decade elapsed between the end of the peak years at Rancho Santa Anita, under Reid ownership, and its acquisition as an investment by Corbitt and Dibblee in 1858.[6] During the absentee ownership of Henry Dalton, then the inept management of a circus man named Rowe, many fine plantings of mission stock suffered from neglect and even disappeared — especially the garden plants and trees that had no practical value. *Tules* encroached on the once-clear water of the lake, and its level went down during drought years until it seemed scarcely more than a marsh.

The countryside also changed, as did the easy-going, hospitable atmosphere during the war years and subsequent transition from Mexican to American ways. Life in the San Gabriel Valley no longer centered around the mission. It took little time, during the secularization process, to destroy what had been years in the building. Hugo Reid wrote sadly: "Destruction came as a thief in the night. The whites rejoiced at it. They required no encouragement, and seemed to think it would last forever. Even the mere spectators were gladdened at the sight, and many of them helped themselves to a sufficiency of calves to stock farms."

As the *pueblo* of Los Angeles displaced San Gabriel in importance, hotels were built and the stranger no longer participated in home life as a matter of course. He could easily remain unaware of its delights. For instance, when young Thomas Dibblee came to look over the Santa Anita and report on conditions there to his brother Albert, it was natural that he should stay at a hotel — not in a run-down ranch-house nor a strange home. He was accompanied by his sister Helen, an elegant young lady from New York who found southern California quite disappointing. They wrote together from Los Angeles on March 25, 1859, to Albert in San Francisco:

> Dear Brother,
>
> Your letter to Ellie per Overland Mail was received yesterday afternoon, the mail having been delayed by upsetting of stage. We had a pleasant passage in the 'Senator', and a good day for the ride from San Pedro here, on Sunday, the sky being overcast . . .
>
> Ellie was not affected by the journey. We were told on arriving at the hotel there was no room, but after Mr. Banning (14) spoke to the proprietor, we were led through a dirty alley between wooden shanties, to an old wooden house on the rear of the lot, up an outside wooden stair and in the second story of the house shown a room which Ellie was to have, and another room which Mr. Burnett and I were to occupy in common with two other persons.
>
> After trying in vain at the 'Lafayette' Hotel opposite the first to get quarters, and also without success inquiring for a private family where both of us or Ellie alone could go, I was compelled to take the above rooms, but in the afternoon changed them for others a little better at the

[6]The tenures of Corbitt and Dibblee, Dalton and Rowe all are sketched on pages 127-128.

'Lafayette'. For myself it would have made of course no difference about accommodations, but it has not been very comfortable for Ellie although she does not complain. This town is a queer place, very unprepossessing, and we have laughed a good deal at the idea of our bringing so many things in clothing which will never be required, particularly dresses for Ellie. There do not seem to be any ladies here (as we have seen none) or any houses in town where any are likely to reside. The whole place appears, so far as buildings go, to have felt very little the effect of changing from Mexican to American hands and is entirely behind the age. The new hotel 'Bella Union', not yet finished, is a good brick two story building; there are two or three other two story buildings, the rest are old and dilapidated, low, flat-roofed, one story adobes, except here and there a one story brick store. But of course ten years hence there will be great improvements. There are many vineyards near town, generally on sandy soil . . . and at this time the vines being mere scraggly trunks without leaves, the places are uninviting. The Sanseverain vineyard however looks fine having shade trees about it which others generally have not.

We intended to go to the Ranch (St. Anita) on Monday but it rained a drizzle all day and we deferred it until Tuesday when we went. Mr. Corbitt on his horse, and Ellie, Mr. Burnett, myself, and Mr. Leighton, surveyor, in a two horse buggy. After all the bare coast country and many hills bare of trees on our way out towards San Gabriel we were delighted to come to a tract with trees and fine pasture and soon after to enter upon the west end of Santa Anita.

That part of the ranch is covered with trees (small leaved oaks) standing apart sufficiently to drive through; the ground here is undulating and altogether it forms a very pleasant place; the grass and clover too are green now; this description applies to nearly all the part we passed through lying west of the house and also from a short distance north of the house, northerly to the mountains, but in parts above there are open places or fields clear of timber. The trees are oak I should think, and their trunks are rough and crooked and the branches also crooked and wide spread. Among these trees and knolls there are several spots quite picturesque; back of the whole ranch at the north, rise up abruptly the Sierra Madre Mountains, steep and rugged and bare except the gullies which appear to be filled with brush and scrub timber; the top of the range is broken into sharp peaks. Around the house the ground is probably moist as it is covered with a thick growth of clover grass and mallows and near by is the springy place which is now being converted into a "mill pond" and from which is a fine flow of water. East of the house is the vineyard and beyond for miles lies the plain, extending far beyond the end of the ranch; on this plain are the sheep and not far off from them a herd of cattle, the latter belonging to some Drover, I believe; and beyond the ranch, south of the house about ¼ mile distant commences a tract of poor land, being a plain covered with clumps of scraggly bushes, the soil being very poor; this continues to the southerly boundary.

There are some other poor fields but I think that generally the soil is good and in many parts very rich. One trouble is the ground is full of gophers (don't know whether I spelled it correctly). The house is situated on a bare knoll commanding an extensive view to the eastward, but behind the house(westwardly) is a high knoll with a very gradual rise having some good oaks upon it and being altogether a better place for the house except that it is further from water; but it was a mistake . . . not to have built either there or on the edge of the oaks on the rising ground a little further towards the mountains, where are some green and beautiful spots probably capable of being watered from springs which ought to exist near the foot of the mountains toward which the ground gradually rises.

The house is a one story adobe in form of an L about 59 on one side by 80 on the other and one part 20 feet deep, the other 18 feet deep, divided into three rooms in one branch and (as they told me) five rooms in the other, the latter being for the hired persons.[7] It is one uniform height outside; ceiling of one room I measured being 9 feet 4 inches. The wall of one of the ends (the west) was cracked and settled and will require to be rebuilt if it is intended to keep up the house eventually. The roof is good apparently; I should think first rate, and is of shingle — I should have said the rest of the walls seem good and that I did not discover cracks except as above, but they cught to be protected from the wet by either very wide eaves to the roof or some other means,—a piazza could have been built but it would have cost a great deal as the length would be very great. There ought at any rate to have been around about half distance and projecting eaves for the remainder; the eaves now project about 15 or 18 inches and it would have cost very little more to have made them project double that; the outer plastering has mostly crumbled. Four of the rooms are floored, none are ceiled and there are no window sashes . . .

I am much pleased with the ranch and agreeably disappointed as from what little I had seen of a few of them and of the country previously, I was prepared to see a very dry, mountainous, uninteresting place. I doubt whether others look as well — I do not know what the effect of summer may be on it as I have no experience of this. There is some land which would probably be green but I do not believe there is much of it.

Mr. Corbitt is very enthusiastic, I fear rather too much so, but at the same time he is very energetic about it and enters into the matter with zest. There are a number of men now at work driving on the ditches, etc., for the vineyard. The latter is not yet completed although in good progress — he is driving it on as fast as possible and has now gone out to stay some days there. He has some difficulty about men — some leaving unexpectedly sometimes and making it necessary to get others.—

March 26th

Ellie seems to like the place — I am finishing this letter at 'Thomp-

[7]It must be remembered that Thomas Dibblee is describing the *adobe* ranchhouse as it appeared after Dalton neglect and Rowe alterations amounting to the then large sum of $6000.

sons', a little tavern about five or six miles from the house [at El Monte] where I have come with Ellie for a few days, this being the nearest to the ranch where I can find a place to stay. The fruit trees and cuttings arrived yesterday at Los Angeles and have been sent to the Ranch. I am just going over to see the setting out. I have not examined them but Mr. Corbitt looked at them; he says the trees are budded some and vines look very dry; also that the cuttings are so small he will have to plant them at present in a nursery, as, if put out in the usual way in the vineyard, they will be ploughed up and otherwise stand a poor chance.

Corbitt's and Dibblee's plans for developing the Santa Anita were intelligent and extensive. But an increasing loss of confidence in Corbitt by the Dibblee brothers, added to problems induced by the drought years, caused their decision to sell the property.

Albert Dibblee was especially disappointed, because he envisioned a paradise in the Santa Anita. This appears in a letter to his older brother William who, of all of the brothers, knew most about agriculture. He managed the family farm at Kingston, New York state. Writing from San Francisco to New York, April 1, 1858 Albert admits:

> I have never seen the property, but have as good a knowledge of it as one can derive from witnesses and all agree in describing it as one of the best Ranchos in the Southern country.
>
> In 1854, Jos. A. Rowe, then a successful circus proprietor (having returned from Australia with a reported $100,00 to $150m) after examining that part of the State, selected his Rancho and paid for it $33,000,—he also spent $6,000 in re-building a house now upon it and other expenses for an orchard and etc., say in all $40,000 and over.
>
> We paid for the property, 13,316 acres @ 1.25,—$16,645.
>
> The great drawback of most Ranchos in Cala, is want of wood and water. This one is abundantly supplied with both,—in fact the wood could be sold for a large sum. Corbitt is in active business and cannot reside on the Rancho, nor can I.
>
> The Southern country is our vine growing district, the production of the grape there is almost fabulous, far surpassing the yield in Europe. The culture is attracting great attention, already many are going down to Los Angeles to engage in it. Already several persons have made fortunes by their vineyards.
>
> Santa Anita is admirably suited for grape growing. Every fruit of the temperate zone flourishes there and most of those of the tropics — oranges, almonds, etc., etc. My idea of the property is that it should be turned to account for *stock raising*. Cattle winter themselves, as you know, in this State. A few Vaqueros only are needed to keep on the look out — their wages are about $15. or $18. p. mo. and board, say beef and beans. 2 or 3 only are needed for a large number of cattle.

The increase of cattle here would be about 80% an. — that is 80 calves to 100 cows. 3 year old cows will always have calves and often sooner. So you can readily see how rapidly the cattle accumulate if not sold off.

This is to be by far the greatest stock raising State in the Union.

I think it a safe calculation, 300 cows put on the Rancho and looked after, none sold till end of seven years, would then allow 1000 head p. an. to be sold and still keep the number whole.

Cattle are usually worth $15 to $18 each in Los Angeles Co. Also sheep can be profitably raised by present appearances, as to pay, for wool growing. At the present they are valued most for mutton but for that purpose they will not always pay. I know less of sheep but think they must be very profitable where no expense for wintering is incurred.

While the stock were increasing, by degrees a splendid vineyard might be got ready at a moderate expense,—plowing per acre $2.50 to $3.50, by contract, cutting costs $2.50 p. thousand (1000 to an acre), irrigation at Santa Anita would cost very little, — in 3 years the vines are in large bearing and would thereafter produce regular crops; 20 acres or so per year might be got into vineyard. The vines yield by *lowest estimate* hlf. gal. each, say 500 gals. p. acre, now worth as it runs from the press 50 ct., p. gal. — but allowing that it fell in value some years hence by largely increased production, so that after it had been refined and acquired age it would be worth only 50 cts., it would still pay handsomely. 100 acres of vineyard at 500 gals. p. acre would produce 50,000 gals. wine per year. Most of the estimates of production are 800 to 1000 gals. p. acre. In Europe I heard it is only 300 gals.

Peaches grow in Los Angeles in profusion, but won't pay as they won't bear transportation. Pears also thrive splendidly and pay to send here. (There is a pear orchard on Santa Anita and was a peach orchard but has not been looked after and is probably run out.)

Almonds thrive well, if they can be raised of right quality, say Languedoc, or Tarragona, they will pay splendidly,—they yield as quickly as peaches I am told. Also I think all the nuts which are now imported from abroad and sold largely here, say English walnuts, pecans, peanuts, etc., must do well in that climate and soil.

If labor becomes cheap, tobacco and cotton can no doubt be raised abundantly in Southern California, also sugar cane.

I have no doubt part of the Santa Anita would be splendid corn land, as it is described as being similar to the "Monte Ranch", some 10 miles off, which is the best corn land in Cala. There is but little land in the State fit for corn, owing to the long dry summer and hard clay soil. Santa Anita is a light loamy soil and never bakes and has moisture in it from springs.

The Rancho is all bottom land, lying along the base of a high range of mountains, which are and always will be public lands, as they are not

worth taking up,—but at certain times of the year they are said to afford a very good range for cattle.

My opinion is that the Southern country (Los Angeles Co. is the best part) must fill up quite rapidly and it is destined to be the richest agricultural portion of the State. Taken care of properly I think Santa Anita, ten years hence, will be a fine estate. If I can get time I will send you a sketch map of the property.

Neighbors, of course, are scarce in that country and the Spanish element largely predominates as yet, but Americans are fast coming in and will by degrees drive out the Spanish. Many of the old and wealthy Californians still retain their property and are said to be very pleasant and polite people to associate with. Of the Americans, there are many

Where Rancho Santa Anita had its beginnings: A nineteenth-century photograph of Ranch Santa Anita shows the lake and the adobe.

highly respectable people now residing there. Old Dr. White who was well known in St. Louis in his cholera practice has a vineyard and house adjoining Santa Anita (but remember, S. A. is 7 or 8 miles long and some 3 broad); also M. Wilson, State Senator, adjoins it with his vineyard. I find many here are thinking of investing in the vinegrowing country and I believe a good population, Germans and French, will by degrees get in there . . .

I think this Rancho if used carefully would within ten years pay more profits than 80 or 90 such farms as you have at Kingston . . .

The climate of Los Angeles is one of the healthiest in the world. Summers I think by all accounts, milder than New York, *nights always cool* (this is a guarantee against the lassitude of your hot summer days

and sleepless nights). Winter a little chilly, but only agreeably so. You may judge how wild the winters are from the oranges ripening in Jany. and Feby. (this is a very profitable fruit also,) in fact Los Angeles County is the garden of California.

The Old Arcade Depot of the Southern Pacific Railroad in Los Angeles, about 1861. The orange trees beyond were part of the 100-acre grove belonging to William Wolfskill.
(Courtesy of Title Insurance and Trust Company, Los Angeles.)

A friend of mine, a great agriculturist and horticulturist, Wm. Neely Thompson, has just returned from his first visit to Los Angeles, perfectly charmed with the country, — he heard much talk of our purchase down there, and all expressed a high opinion of the property and *the bargain* . . . Another idea has ocurred about the stock. The regular stock men seldom pretend to milk any cows. Now, at least a portion of the cows might be milked while the feed was good and all the milk made into cheese, (butter is too much labor); Cala. cheese, ordinary, is worth 22 to 25 cts., if made of unskimmed milk it would bring 3 to 5 cts. more, and large quantities can be sold. Would not this pay? I don't know the process of making cheese, but it cannot require any great labor. In August I shall probably go down and see the Rancho...

Winter is the time for nearly all kinds of farming operations in this country. I have written 5 times as much as I meant, but couldn't say

all in less. Wish I had a chance to talk this over with you and mother and Thomas. It would be farming on a scale one might be proud of after a few years.

THE HOME PLACE

Albert Dibblee never saw the Santa Anita while he owned it. The *rancho* remained a beautiful dream — to tantalize him in the midst of all the corruption, violence, arson, greed from which San Francisco suffered during the Gold Rush, and for a few years afterwards. During the 1850s, Vigilantes formed of the better element acted outside the law, because no enforcement was possible under corrupt city and state officials.

Unpublished family papers reveal Albert Dibblee as a member of the inner, inner Vigilante Committee of Three.(7)[8] At that time, and for a few years longer, he lived alone in a ramshackle apartment above a store (his money was mostly made in trade). Four times the city burned, in as many years. The scream of sirens, the shouts of drunken miners often disturbed the young man who lay dreaming of Rancho Santa Anita in the peaceful, sunny south.

Not for twenty years was the Dibblee dream materialized, and then by a man of equal, and oddly similar vision. "Lucky" Baldwin fell in love with Santa Anita and bought it straightway (14) — with a fortune wrested from a violent, northern scene. The Comstock Lode, flourishing a quarter century after the Mother Lode, offered silver instead of gold to greedy miners from all over the world.

Tangible evidence of vision combined with industry, was described by H. H. Bancroft during a visit to "Lucky" Baldwin's "Home Place" in 1891, when Rancho Santa Anita appeared at the very peak of production. Like many visitors before him, and many more afterwards, the historian was moved to rhapsody:

"The scene is one of fairy-like loveliness; not only the little *bijou* residence and its surroundings,[9] but the entire estate, with its groves and vineyard, its golden fruit and waving harvest, its shaded drives and vistas of mountain peak and valley, carrying the beholder into an ideal region, calm and peaceful as the fabled realm of Rasselas, where soft vernal airs induce forgetfulness of the din and turmoil, the crowded streets and selfish intensity of city life."

[8]Generously loaned by Harrison Dibblee, Jr. of Ross, California.

[9]Bancroft refers to "Lucky's" elegant house built for entertaining not far from the simple old *adobe*, his real residence while on the ranch. Sharing the lake and the mountains, they still are strangely separate. Each typifies an era, as did their builders, Reid and Baldwin.

PART TWO
THE PEOPLE

Rancho Santa Anita
Chain of Title

King of Spain—1771

The Mexican Nation—1822

Hugo Reid—1839-45

Henry Dalton—1847

Joseph A. Rowe—1854

William Corbitt and Albert Dibblee—1858

William Wolfskill—1865

Harris Newmark—1872

Elias Jackson ("Lucky") Baldwin (and heirs)—1875

Harry Chandler—1936

State of California—1947

KING OF SPAIN—1771

Title to the Californias, first Baja (Lower) then Alta (Upper), was vested in the King of Spain under the monopolistic Laws of the Indies. Following the establishment of Mission San Gabriel in Alta California in 1771, more than 13,000 acres, extending north of San Gabriel to the Sierra Madre mountain range, became the mission farming land known as Rancho Santa Anita. Franciscan monks administered it for many years.

Cattle, horses, hogs, sheep, grain and fruit were raised on the fertile land, the virgin soil. Water abounded, in springs, streams, and a natural lake where the enterprising *padres* built a grist mill. Besides supplying mission needs, they engaged in a flourishing "hide and tallow" trade with sea captains and "supercargoes" who sailed to the West Coast in increasing numbers from the outside world.[10]

THE MEXICAN NATION—1822

Spanish rule in Alta California yielded to Mexican in 1822, after Mexico's successful revolt against Spain. Temporal power of the Church was broken, through passage of the Secularization Act of 1833. But the able administration of Rancho Santa Anita by *padres* from the San Gabriel Mission continued until secularization of all the missions was completed, in the late 1830s.

[10]Company agents on shipboard, like "Don Alfredo" Robinson, acting on various coastal vessels for the Boston firm of Bryant and Sturgis.

HUGO REID "The Scotch Paisano"—1839-45

Reid, a Cambridge classmate of Charles Darwin, was a Scot who became a Mexican citizen in 1836 — after several years of trade in South America and teaching in Mexico. In '37 he married an Indian neophyte from San Gabriel Mission, and is best remembered for informed and interesting "Letters" on his wife's people. (16) He petitioned for Rancho Santa Anita in 1839, when church property was fast passing into private ownership.

Assured of eventual title, Reid built an *adobe* ranchhouse, using Indian labor, and started new orchard and vineyard plantings. In '41 he received provisional title from Governor Alvarado. But not until 1845, on the very eve of Mexico's war against the United States, did the first lay owner of Rancho Santa Anita receive full title from the last Mexican governor of California, Don Pio Pico.

HENRY DALTON—1847

Dalton was an English merchant who settled in Southern California in 1843, after a successful business career in Lima, Peru. A decade earlier, Hugo Reid had been his partner in a trading venture to Hermosillo, Mexico, and they renewed the old acquaintance. Like the "Scotch Paisano", the Englishman became a Mexican citizen and a Catholic in order to own land in California and marry a native daughter. Dalton's father-in-law was Don Augustin Zamorano, remembered as the first printer in the territory (11).

The newlyweds came to live near the Reid family at Rancho Azusa, adjoining Santa Anita on the east. During the Mexican War, when Reid became hard-pressed to the point of offering Rancho Santa Anita for sale, Dalton bought it for 20 cents an acre ($2,700) — although he kept the Azusa as his permanent home.

After the War, Alta California was ceded to the United States and, in 1850, admitted to statehood. Henry Dalton's title to Rancho Santa Anita was upheld by the American Board of Land Commissioners, in spite of being a last-minute grant by the fleeing Mexican governor. Several such grants the Commissioners ruled invalid.

JOSEPH A. ROWE—1854

Rowe, owner and star performer of California's pioneer circus (19), bought the Santa Anita for $33,000 — retiring from the sawdust ring to raise cattle. He also pastured a few wild animals and performing horses.

But Rowe and his pretty wife, both trick riders, were inexperienced and unsuccessful ranchers. After giving a mortgage on the place to William Wolfskill, they took the money and went back in show business — off to Australia — leaving a foreman to run the ranch as best he could, until a buyer appeared.

WILLIAM CORBITT and ALBERT DIBBLEE—1858

Albert Dibblee, a New Yorker who attained prominence in San Francisco's business and political life, bought the Santa Anita as an investment, sight unseen, in partnership with a Los Angeles promoter and trader named William Corbitt.

They took over the Wolfskill mortgage and acquired a fine ranch of 13,316 acres for $16,645. Joseph Rowe, the only owner who did not make a profit out of Ranch Santa Anita, wanted to be rid of a burdensome property — even at a 50% loss.

Neither of the new owners ever lived on the ranch. It was managed by a younger brother of Albert Dibblee's named Thomas, who left a promising law practice in New York City to come to Southern California. Albert remained in San Francisco, earning the money for capital expenditures. Their hopes rode high until the catastrophic years of drought commenced in the early '60's, ending the great days of cattle ranching in California.

The beautiful lake at Santa Anita, fed by springs, dried and shriveled into an ugly marsh. Livestock died like flies on bare, paper-dry pastureland. When the partners decided to sell, Thomas Dibblee moved to Santa Barbara. He married into the royal family of the region, that of Don José de la Guerra; and managed another ranch, the Lompoc, for his older brother.

LEONARD ROSE—1865

Rancho Santa Anita was sold in two sections. The first and most important subdivision of Reid's original grant, 2,000 unimproved acres in the west, went to an industrious German named Leonard Rose, for $2 an acre. In time, after extensive irrigation, he created a splendid estate — a showplace known as "Sunnyslope." Grapes grown from Rhineland slips and trotting horses became Rose specialties. He also produced highgrade citrus fruits, wine and the brandy called *aguardiente* (firewater) by the *paisanos*.

WILLIAM WOLFSKILL—1865

Wolfskill bought the remainder of Rancho Santa Anita including the homesite — 11,316 acres for $20,000 — with the idea of irrigating and raising more diversified crops than anyone in the country. Widely known as a horticulturist, he appears in Bancroft's "Pioneer Register" as "the pioneer [with his French *vecino*, Louis Vignes] of California's greatest industry, the production of wine and fruit." He had known and coveted the Santa Anita ever since mission ownership.

Wolfskill first came to California from Taos in 1831, heading an overland beaver-trapping expedition (13). He was a Kentuckian of German ancestry, belonging to that "reckless breed of men" who met and overcame incredible hardships crossing the continent afoot or horseback — fighting hostile Indians, sinking in deep snow, suffering from thirst on interminable desert stretches.

The Wolfskill party made a winter crossing of the Wasatch Mountains, the great Mojave Desert, and then — only five years after Jedediah Smith showed the way — climbed over the Sierra Madre and down into San Gabriel, where exhausted men found beds and food at the mission. It was while resting there that the party leader first saw Rancho Santa Anita, and fell in love with the land.

Wolfskill settled down in Los Angeles. His home in the center of town became a mecca for former trappers, and a showplace surrounded by fruit trees. He married a daughter of Don José Lugo, Magdalena, with whom he raised

a large and congenial family. Often the Wolfskills would pile into a *carreta*, or ride horseback out to the Santa Anita — to visit with Reids, Daltons, Rowes, or Thomas Dibblee. But possession came too late, for William died in 1866. He had only time to plant some eucalypti from Australia, and a few date palms which he introduced to California from Africa.

An attractive "birdseye view" of Arcadia in the 1880s. The Baldwin home (and the land now comprised by the Arboretum) is shown in the lower left-hand corner of the picture.

His youngest son Louis — named for Louis Vignes and married to a daughter of Henry Dalton — inherited the ranch, developed and further subdivided it. This period was one of rapid change in the use and value of California land. Among Louis' sales was the section now known as "Chapman's Woods," 1,740 acres adjoining the Rose estate, sold for $19,500 to Alfred Chapman, a West Pointer with legal training.

Although inexperienced in ranching, Chapman was intelligent and industrious. He set out and irrigated a record number of orange trees. Citrus orchards of other owners sprang up where livestock had roamed in undisputed possession of the countryside, only a few years previously. The entire San Gabriel Valley was pastureland until that time — save for an infrequent garden near an *adobe* building

(with never a lawn), a few vineyards and other plantings of slips and seeds carried afoot from Lower California by the Franciscans, or brought in by sea-captains.

HARRIS NEWMARK—1872

Newmark, the merchant — author of *Sixty Years in Southern California* (15), paid $85,000 for Rancho Santa Anita, reduced by sales to 8,000 acres. Besides putting more land under irrigation for orchards and vineyards, he pastured sheep in the rocky foothills, as an adjunct to a flourishing wool business in Los Angeles. He did not live continuously on the ranch, but made good use of the *adobe* during frequent visits.

Newmark deeded a northern section of his property to the Southern Pacific, realizing that land values would skyrocket with the coming of the "Iron Horse." But before this could happen, he sold the Santa Anita for a fabulous price to a fabulous person.

ELIAS JACKSON ("LUCKY") BALDWIN—1875

"Lucky" Baldwin — rich from the sale of Ophir mine stock in the Comstock Lode — paid $200,000 for Rancho Santa Anita. Born of poor, pioneer parents in the Ohio wilderness, he set out to rival all the "Bonanza Kings" in Northern California — with his racing stables and private track, his deer park and stately peacocks, his pleasure pavilion and exotic plantings around the lake that he restored beyond its original size and beauty.

Like his German neighbor, Rose of Sunnyslope, "Lucky" had a practical side — shown in the fine livestock and poultry, fruit and nut trees, grain fields, vineyards, winery and the buttery that supplied his ranch houses and three hotels that he built (in Arcadia, San Francisco, and Lake Tahoe) with plenty left to sell in the open market.

Among his frequent guests at Santa Anita were stars from the Baldwin Theatre in San Francisco, always entertained in his "Oakwood Hotel" or the elegant "Queen Anne Cottage" right on the ranch,[11] while he himself lived in the simple *adobe* at the southern end of "Baldwin Lake." There, eventually, he died — remaining a controversial, contradictory character to the end of his days (10).

★ ★ ★

[11]The Victorian era favored fanciful terminology and, for reasons of his own, "Lucky" Baldwin dubbed his guest house "Queen Anne Cottage." From the standpoint of architectural design, the term has no validity whatever; but, it has become so fixed in the minds of the public that there seems little likelihood of its ever being dislodged. The cottage was completed in 1881. It is a typical expression of the late Victorian period in which it was built.

"Lucky" Baldwin's Tally-Ho, with coachmen and four, makes a nostalgic tour of the Arboretum grounds. (Photo by Denis Kucera.)

Since the first discovery of gold in California, residents have been tantalized by "get rich quick" schemes of all kinds. In the late 1840s the tempo of living commenced to accelerate, even in the south where easy-going *rancheros* made sudden fortunes selling beef to rich but hungry miners. Besides pasturing and mining,[12] other uses of the land were explored by new owners, of all nationalities. Of the new uses, even including oil discoveries, the sale of real estate has made easy money for the greatest number of people through the years.

As early as 1855, Henry Dalton became the pioneer realtor — using modern promotional methods. During the first decade of his residence in southern California, he acquired approximately 45,000 acres of ranch land. With the sale of Santa Anita to Rowe in '54, he commenced to break up this huge acreage — acquired mostly without cost, by grant from the Mexican government. To dispose of the dry and rocky foothill section of Rancho Azusa, he tried the lottery method — offering prizes, in real and personal property, including 240 "elegant lots in the

[12]Refer to page 313, in Newmark's, *Sixty Years in Southern California*. "Although cattle raising was the mainstay of Southern California for many years, and gold mining never played a very important part here, Wells Fargo and Co., during the spring, frequently shipped thousands of dollars worth of gold at a time, gathered from Santa Anita, San Gabriel and San Fernando placers, while probably an equally large amount was forwarded out through other channels."

town of Benton." This might be called a "ghost town," since it existed only in his imagination.

Not enough gullible people had yet found their way to Southern California, so Dalton failed in this promotion scheme. Not until the boom of the '80s did a town actually rise at Azusa. As a real estate operator Dalton was forced into second place when Nathaniel Carter came out from Lowell, Massachusetts, to recover from "consumption." Arriving in '71, he bought 17 acres of Santa Anita foothill property from Dalton's son-in-law, Louis Wolfskill who by then was doing some sub-dividing on his own.

Carter's recovery was quick, and he became "the most picturesque boomer" California has ever known (8). He circulated a picture of himself called "Before and After Taking," and would explain that this referred to the climate as a sure cure for *t.b.* Even before the Southern Pacific reached the area, in 1872 he tried to interest Collis Huntington, as one of the railroad "Big Four" (14), in adding cheap excursion cars to westbound trains. Two years later, and for twenty-five years thereafter, Carter made annual trips back home for the express purpose of advertising his adopted state. He achieved official status as Excursion Agent for the Santa Fé.

Nathaniel Carter prospered by becoming the "first California booster to boost on a large scale." In 1881, he bought 845 acres from "Lucky" Baldwin for $33,880. He piped water down from the Santa Anita and Little Santa Anita Canyons, divided the entire property into town lots, advertised widely, sponsored a stylish hotel called "Sierra Madre Villa," also a church and a school — and soon attracted a colony which he called "Sierra Madre." "Lucky" admired his way of doing things and asked him to act as agent for the Baldwin properties. Together they planned the "Santa Anita Tract" — a model to this day of high-class residential subdivision.

Mr. Baldwin had added to his original holding at Santa Anita, by canny foreclosure and timely attendance at county tax sales, as well as by outright purchase. By 1885 he owned over 80,000 acres of increasingly valuable southern California property. Unlike Henry Dalton, thirty years earlier, he found the time ripe for a successful sale of his surplus land. His first prospect appeared as an overnight guest at the Santa Anita, a railroad engineer from Texas named William Monroe who had settled in Los Angeles and become a member of the City Council.

After seeing the Carter advertisements of Sierra Madre, Monroe decided to build a modest country home in the San Gabriel Valley, somewhere. His host enlarged his ideas. Before departure next day he had bought, "choice, frost-free," thirty-acre lots in the wild undeveloped area that became the boom town of Monrovia.

A Los Angeles businessman named Jonathan Slauson revived interest in Azusa as a townsite and helped to organize the Azusa Land and Water Company with a capitalization of $500,000. Although this company acquired 4000 acres of predominantly fertile land from the Dalton family, Slauson located the town in a desolate, rocky, sandy wash. When asked why, he answered: "If it's not good for a town, it isn't good for anything."

With examples of such enterprise all around him, Baldwin commenced to plan his own community. From the Santa Anita Tract sprang Arcadia, east of the historic homesite where "Lucky" continued to live. Water rights were shared with the Sierra Madre Water Company, founded by Nathaniel Carter; and shade trees. Santa Anita seedlings, were planted along all the new streets. Arcadia was solidly

E. J. (Lucky) Baldwin
(Courtesy of Title Insurance and Trust Company, Los Angeles.)

established when the boom "shriveled" at the end of a rate war between the rival Southern Pacific and Santa Fé railroads.

At one time, in 1887, the cost of a ticket from Kansas City to the coast descended to $1. Mr. Carter's excursion trains overflowed with gullible prospects. well supplied with real estate literature. Baldwin learned the jargon, and even improved upon it. When one prospect protested the price as too high for unimproved property, the answer was, "Hell, we're *giving* the land away. We're only selling the climate." So successful were "Lucky's" methods that the Louisville *Courier-Journal* held him up as a symbol of California agressiveness.

owner. Director of Restorations was the late Maurice Block, formerly Curator of the Henry E. Huntington Art Gallery and originator of the period rooms there. Because of depreciation — caused by dry rot, termites and vandals — the latest to be built was first to be restored. The frame "Queen Anne Cottage," finished in 1881, was dedicated as Historical Landmark No. 367 of the State of California in 1954. Money from the accumulated Tidelands funds was allocated by the State for architectural restorations of the frame carriage house and the *adobe* ranch house. Private funds have paid for the elegant Victorian restoration and the furnishing and landscaping of the other two buildings in the Historical Preserve.

A formal garden enhancing the Queen Anne Cottage was planned and planted by the late Charles Gibbs Adams. From boyhood visits, he remembered and restored pampas grass reflected in the lake, Russian violets edging the paths, banksia roses rampant. His successor, whom the Historical Committee shares with the entire Arboretum as Landscape Consulant, is Edward Huntsman-Trout. To aid him in planning an authentic setting for the *adobe,* there is Hugo Reid's own planting list for 1844 enclosed in a letter to his friend, "Don Abel" Stearns.[13]

Early plantings are treasured wherever they survive. Several of the ancient trees have grown from tiny seeds or slips to extraordinary size. There is a pomegranate, more than 100 years old, probably from the San Gabriel Mission garden, a eucalyptus given to Albert Dibblee in the 1850s by a sea-captain coming from Australia, a date palm introduced from Africa by William Wolfskill, seven ginkgos carried home by "Lucky" Baldwin after a big game hunt in India, and so on.

With the exception of Rowe the circus rider and Chandler the newspaper tycoon, each owner of the Santa Anita has pioneered in some way during tenure — in improvement of livestock, plant introduction, new uses of the land and modern farming methods. Henry Dalton originated a method, still in use, of packing grapes in sawdust. Among these were the first French winegrapes grown in California, started by Hugo Reid from slips of his *vecino* Louis Vignes.

Reid's planting inventory is an amazing document of the time and place. He diversified Santa Anita products as seldom was done. On vast ranges of the early *ranchos* in California, there was no attempt to produce more than hides and tallow for the coastal trade. Foodstuffs, clothing, and other necessities and luxuries, came mostly through trade. On arrival of a sailing vessel at the nearest port, *rancheros* and their families from miles around climbed aboard — to see and feel and taste wonders from the outside world.

Back in home pastures choice meat may have been left for the buzzards, after a slaughter for hides that sold at $2 apiece. Few *rancheros* bothered to make butter or cheese, or even to keep cows that must be milked. Irrigation did not become general practice until after the disastrous drought of the 1860's. In that empty, bountiful land — California before the Gold Rush — there was scarcely any need for the residents to exert themselves. The aborigines had lived without farming at all.

As the population increased, land use became intensified. As acreage shrank

[13]Dated June 1, 1844. Preserved among the Stearns papers in the Huntington Library. Published in *Lasca Leaves*, Summer, 1951.

on the original *ranchos,* production went up. Moving with the times, using the most advanced farming methods, the owners of the Santa Anita developed the fertile land for their private need and gain.

With the establishment of the Los Angeles State and County Arboretum a new era has commenced. As in earlier days, seeds and slips arrive from similar geographical zones of the world, for experimental planting. Confined to a tiny fraction of the original land grant, dedicated men and women at the Los Angeles State and County Arboretum continually are expanding our knowledge in the fields of botany and horticulture, and, at the same time, preserving a vital link with California's rich historical heritage.

Looking west, across the lagoon, to the Queen Anne Cottage. The cottage became California Historical Landmark No. 367 in 1954.

THE HISTORICAL PRESERVE

"Lucky" Baldwin's daughter Anita named the "Queen Anne Cottage," for reasons of her own. In 1880-81 her father had built it for her mother, his third wife, who died at twenty-three. Inside, there are two portraits of this pretty, dark-haired Jennie Dexter Baldwin; one, in the stained glass front door and the other, an almost life size oil painting on the west wall of the front parlor. In the study is a large landscape painted in oils by H. H. Cross in 1889. A bearded Baldwin occupies the foreground in fashionable attire, even to grey kid gloves, surrounded by mastiffs, in company with a young girl, hair hanging down, wearing a short, black-bustled dress. This is the motherless Anita. Across the Lake, left background, is pictured the fanciful red and white "Queen Anne Cottage" looking spruce as it does today.

After Mr. Baldwin's death in 1909, all detachable integral parts of the elegant "cottage," which had become his guest house, were carefully crated, under his daughter's supervision, and stored in the Coach Barn for forty years. In remarkably good condition, when restoration commenced, was the stained glass ordered in

The music room of the restored Queen Anne Cottage.

The Queen Anne Cottage, built by "Lucky" Baldwin in 1880-81, greets thousands of Arboretum visitors each year.

England, picture windows for all the rooms including Shakespeare in the study, nymph scenes in the bathroom, and the portrait front door; the beautiful black walnut doors with their tooled hardware, white marble fireplaces flecked with gold, intricate marble and tile paving for the front hall and whole outside entrance. A German carpenter who had worked on the place seventy years earlier, recalled details of trim, interior colors and furnishings, with amazing accuracy. In 1881, he had been on hand for the arrival by "Iron Horse" (Southern Pacific from San Francisco) of flowered carpeting, crystal chandeliers and long gilt mirrors. Where the original Baldwin furnishings have disappeared, it has been possible to replace

them essentially as they were. For instance, paisley draperies, lace curtains, a fringed table cloth and a beaded footstool were acquired at the fabulous Mills auction in Millbrae. Both Darius Ogden Mills and Elias Jackson Baldwin can be classified as "Bonanza Kings" and their tastes were similar in interior decoration. Neither spared expense; and both acquired *objects d'art* at the Philadelphia Exposition of 1876.

There have been many gifts of suitable furnishings and money, none more welcome than the family paintings and Mr. Baldwin's own marble-top table, to be seen in the bedroom. There are four sizable rooms and a bath, now completely furnished; and a veranda running around the house, besides the three-story tower with narrow stairs winding up to a wonderful mountain view. The architect was A. A. Bennett who is remembered for planning the State Capitol at Sacramento. The formal garden had been neglected, but now is beautifully restored by members of the Pasadena Garden Club. Special features are the giant clam shells, brought by Mr. Baldwin from the Great Barrier Reef; his mounting block by the marble approach and stairway to the veranda; a deep artesian well doubling as a decorative fountain, surrounded by old-fashioned roses.

Everything in the Cottage can be seen by walking around the veranda and peering in at the windows. The bedroom is closest to the front steps; then comes the front parlor with an ever-burning fire and a lady always ready to go out, in bustle and bonnet. Notable here are the paintings, gilt framed, and the over-the-mantel gilt mirror; rosewood sofa and love seat upholstered in red velvet, paisley draperies with her velvet valances; a beaded footstool and beaded flowers in the hand of a weirdly Victorian blackamooress; a silver *épergue* full of fruits and flowers. In the music room is a melodeon, a harp, an old piano and music boxes; a chess set laid out on one small table, and tea service ready on another. An elaborately dressed mannequin, reflected in a long mirror, gives an illusion of occupancy to the room, indeed to the whole house. This faithful restoration is due to the imagination, knowledge and skill of the late Mr. Maurice Block. He directed many volunteers and inspired many gifts, during the furnishing period.

On the piano rack is sheet music appropriate to the period. There is a study and a bathroom with Victorian accessories, but no kitchen. In Mr. Baldwin's day, Chinese servants prepared food in the transformed adobe, then carted it across to the Cottage. They could be summoned by embroidered bell pulls. Chinese lanterns recently have been found to light the veranda.

From handsome iron furniture on the lawn*, a visitor gazes one way across the Lake to the Adobe, simple in its pastoral setting; the other way, over a velvety Mall shaded by ancient trees, to the Coach Barn. This is similar in architecture to the Queen Anne Cottage. It was built in 1879, when the Adobe was transformed to serve as living quarters for the Baldwin household and guests, on visits to the Santa Anita from San Francisco. The Cottage was not completed until well into 1881.

*A memorial to Dewey Nelson, who we honor as the indispensable first Curator of the Arboretum's Historical Preserve.

"O, to have been a horse on the Baldwin ranch!" "Lucky" Baldwin treated his horses more tenderly than some people treat their children. Immaculate stalls in the restored Coach Barn contain novel hay shoots, sliding doors, beautifully wrought iron fretwork. Paneling throughout is of alternating redwood and white pine. The front section was used for carriages; the rear, for the horses; harness was kept in two tack rooms; and grooms slept in the hay loft, less luxuriously than the carriage horses.

Usually standing on the wash rack is the Tally-Ho, a gift of the Baldwin family. It was built to "Lucky's" specifications and displayed at the Philadelphia World Fair in 1876, where he made many purchases for his San Francisco hotel and theater, his home on "Nob Hill," and his proposed buildings on the Santa Anita. The Tally-Ho was expensive, costing nearly as much as a new Cadillac would today. It was used to meet guests and for country outings — *meriendas*, Hugo Reid

The Hugo Reid Adobe, site of the beginnings of Rancho Santa Anita and now part of the Arboretum's Historical Preserve.

would have called them — providing an ice compartment for champagne, wicker food container, rack for ladies' parasols and so on.

Other items of interest now stored in the barn are the old fire fighting wagon used on the Baldwin ranch; the safe from "Lucky's" Oakwood Hotel in Arcadia, probably containing treasures (the lock is sprung); an Indian exhibit in cases against the north wall of the coach room. Many artifacts have been found here at *Aleup-kig-na,* the Gabrielinos' "Place of Many Waters," and there are changing loans from the Southwest Museum.

Now the Arboretum visitor has seen all that remains of the historic buildings on the homesite at Rancho Santa Anita. As he leaves the Barn through the west door, he may take time to admire the ginkgos and other trees that Mr. Baldwin brought in as seeds or seedlings from China and India; the huge elms from "Lucky's" birthplace in the one-time wilderness of Ohio; the eucalyptus, catalpa and palms dating back to earlier owners. These distinguish the grassy Mall from an ordinary lawn in southern California, more recently and less imaginatively planted. English daisies and "Naked Lady" lilies are to be seen in their season, and rarely beautiful is the catalpa in full bloom.

Across the road, there is the Herb Garden; then the walled fragrance area with easily followed paths, designed especially to give pleasure to the blind. Turning southeast, our visitor enters the Rose Garden, both fragrant and full of color. Southwest, up Tallac Knoll and through a native oak forest, there are the Biblical and Tropical plantings and a natural amphitheater. So many paths to choose from! Some lead away from the historical buildings and gardens, around the Lake and into the Jungle (used for innumerable movie sets), over to the experimental lawns, the Home Gardens, the Orchid House.

Come again, come often to the Los Angeles State and County Arboretum. There always will be something else to see, some other path to follow.

¡Hasta la vista! ¡Hasta luego!

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The Arboretum Library also contains a number of materials — books, pamphlets, reports and manuscripts — pertaining to the Rancho and its history. The Library is located on the Arboretum grounds and is open to interested scholars and students from 9 a.m. to 5 p.m. Monday through Saturday.

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NOTE: *Rescheduling of* LASCA LEAVES *publication dates will advance the next issue, No. 2, to June 1968, with quarterly publications to follow in September and December.*

THE COVER

This month's cover photograph shows the hardy groundcover Arctotheca calendula*—Cape Weed—an Arboretum introduction for 1965. Detailed information on this plant appears on page 22 of this issue.*

NOTES ON THE ORIGINAL VEGETATION OF A SINGLE LOCALITY IN THE EASTERN SANTA MONICA MOUNTAINS, CALIFORNIA

By Noel McFarland and Paul W. Colburn

This paper contains notes on many of the higher plants growing in one locality in the eastern Santa Monica Mountains, Southern California, as they were in the years prior to approximately 1955 — that is, prior to the beginnings of destruction by residential expansion and subdividers, and prior to the advent of smog (which is probably having an increasingly adverse effect). The relative abundance of the various species, local occurrences, and the associations and general appearance of the vegetation as a whole are herein described as they were at that time.

The area where these notes were recorded is bordered roughly as follows: On the west by Benedict Canyon Drive, on the north by Mulholland Drive, on the east by Franklin Canyon Drive, and on the south and southeast by an imaginary line connecting Benedict Canyon at approximately Portola Drive with Franklin Canyon Drive at its intersection with North Beverly Drive. These observations were centered (within this larger area) in the vicinity of upper Oak Pass Road and Summitridge Road, approximately three miles (in a direct line) north of Sunset Blvd., Beverly Hills. Also included is information on the original flora in the vicinity of Marion Way fire-road and the northernmost mile of North Beverly Drive, as well as notes on certain species that were locally confined to Peavine Ridge. (See Fig. 1).

This sector of the Santa Monica Mountains was typified by many steep-sided hills and ridges, with numerous ravines and a few larger canyons. While the Santa Monica Mountain range itself runs east-west, most of the ridges and major canyons in this area run north-south. Few ridges exceed 1500 feet elevation in the Oak Pass - Summitdridge vicinity. Throughout most of lower Oak Pass Road and vicinity the soils are predominantly heavy (clays and some paler limestone, etc.) with a few areas of sandstone visible in the road cuts. Upper Oak Pass, and most of Summitridge Rd., Peavine Ridge, lower Marion Way, and North Beverly Dr. are predominantly decomposed granite, with some shale on south Summitridge. Upper Marion Way, upper North Beverly Dr., northern Summitridge, and the adjacent section of Mulholland Dr. are again predominantly heavier soils (red clay on upper Marion Way), or heavy soils with considerable rock; also a few areas of sandstone are visible in the road-cuts.

There was a fire-break which was maintained with some regularity along Peavine Ridge; a rather distinctive flora grew there and all along the rocky, undisturbed southwestern extensions of the ridge. On June 26, 1948, a major fire swept up through all of Peavine Canyon, and was halted along the Peavine Ridge fire-break.

Evidence of this fire is still visible in patches where original vegetation remains, although most of Peavine Canyon has since been subdivided and is changed beyond recognition.

Now (1964) many parts of the region described in this paper are no longer recognizable and, with the ever-increasing subdivisions, all vestiges of the original flora are being cleared off and destroyed. In some places entire ridges have been demolished and pushed into the ravines below them to make subdivision lots. (Eastern Peavine Ridge and areas along Summitridge Road are examples.)

The most notable change in the vegetation, within the last 15 years (aside from absolute destruction by man), is the death of *Quercus agrifolia* in great numbers. Many of the coast live oaks still standing are dying now; few remain in very good condition. Hundreds have already died and fallen, although their trunks have not yet disintegrated (1964).

A few of the subtle changes, noticeable only to a long-time resident of the area, should also be recorded: (1) The increasing rarity (and disappearance) of many of the smaller native wildflowers, some examples of which are *Calochortus, Castilleja, Eschscholzia, Fritillaria, Lupinus* spp., *Nemophila,* and *Orthocarpus.* (2) The gradual but steady increase in non-native species.

The general appearance of the vegetation as a whole was that of a predominantly brushy, dark green to olive-green chaparral cover, blending irregularly with patches of lower and paler green (or grayish-green) coastal Sage Scrub species such as *Artemisia californica, Encelia californica, Salvia mellifera,* and *S. apiana.* Large groves (and many scattered individuals) of completely healthy, dark-green coast live oaks *(Quercus agrifolia)* covered the lower hills and (particularly) north-facing slopes, all ravines and canyons. Oaks were also present, but less common, on the decomposed granite soils and steep slopes of rocky ridges. On heavier soils in the lower hills were several extensive open slopes (mostly east-facing or west-facing hillsides) covered by grass, *Brassica nigra,* and irregular patches of *Juglans californica,* along with scattered individuals of the same tree. These open, grass-covered "walnut slopes" remained unchanged for many years, and no invasion by any of the other nearby abundant woody plants was ever noted. Elsewhere walnut trees grew as isolated individuals (or in small groups) in the chaparral irregularly throughout the hills, particularly on heavier soils. (See Fig. 2.)

There were no *Eriodictyon* spp., *Garrya* spp., *Umbellularia,* or conifers in the area under consideration. There were no established woody exotic shrubs or trees (free of gardens), aside from a few *Eucalyptus globulus* reproducing themselves occasionally in the canyons. A few clumps of *Opuntia* sp. were present in one place, above Portola Dr., which may have escaped from a garden. *Arctostaphylos glandulosa* was essentially restricted to western Peavine Ridge and its branches, where it was not uncommon.

As of June, 1964, the area centered around the intersection of Marion Way fire-road and North Beverly Drive was still in the same condition as it was in 1938 and earlier. This locality contains the last examples, side by side and undisturbed, of all the plant communities (and their mixtures) once typical of this section of the eastern Santa Monica Mountains. There are no precisely similar biotic com-

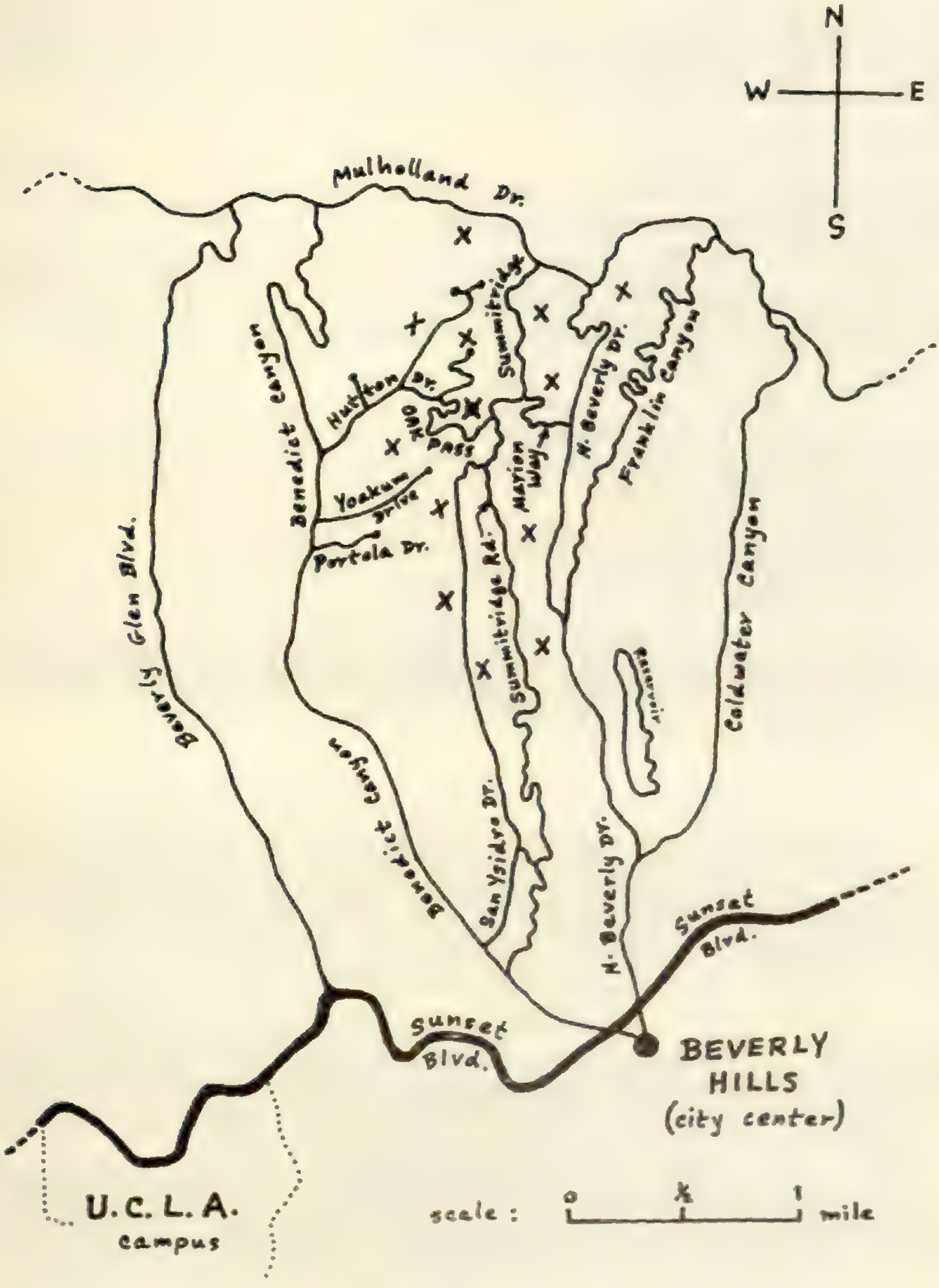


Fig. 1

Fig. 1 — MAP OF THE AREA COVERED BY THIS PAPER: Center of area covered is in the vicinity of Oak Pass Road and Marion Way; other X-marks indicate outer limits of the area covered. Peavine Ridge is (was) extending west and southwest from the highest point along Summitridge, just south of upper Oak Pass. Marion Way was a fire-road with a locked gate at the Summitridge entrance, and N. Beverly Drive was a fire-road with one gate north of the Franklin Canyon turn-off and another gate at the Mulholland Drive intersection. Summitridge Road, from approximately 3 miles north of Beverly Hills to Mulholland, was also a fire-road with locked gates. Oak Pass was originally a fire-road only, until about 1948 when it was opened.

munities anywhere else in southern California, or farther west in the same mountain range. A flora and fauna reserve in this area would be unique in a few decades, by which time all the remaining country nearby will undoubtedly be built up. It is indeed unfortunate that the unique *coast range chaparral communities* are so often overlooked by conservationists.

A reserve in the eastern Santa Monica Mountains would be of great value in future years, if for no other reason than that it would be of such easy access to the numerous professional biologists and naturalists living in the vast Los Angeles city area. The North Beverly Drive and Marion Way fire-road area would be particularly suited to preservation in a single unit due to its compact shape and well-defined borders. Original native mammals, and all birds previously observed, also abound within this sanctuary . . . coyotes, racoons, gray squirrels, deer, numerous valley quail, red-tailed hawks, phainopeplas, wren-tits, Townsend's warblers, gnat-catchers, etc. Migratory birds are still to be found here in great numbers during the appropriate seasons.

A paper on "The Moths of a Chaparral Plant Association in the Santa Monica Mountains of Southern California" (McFarland, 1965), lists all species of moths ("Macroheterocera") recorded for the Oak Pass Road locality in the years prior to 1957, when the area was quite undisturbed. Many details as to time of flight, relative abundance of each species, and new foodplant records, are included.

INTRODUCTION TO THE ANNOTATED LIST OF PLANTS

Unfortunately, this list does not include all the plants in the locality, but all the WOODY species are covered, to my knowledge. Lower plants, ferns, most grasses, and some of the native herbaceous plants (certain small crucifers, *Cryptantha,* and others) and introduced weeds, have not been included due to my lack of familiarity with these groups when I was living at 9601 Oak Pass between 1938 and 1958. All plants which I was unable to identify with certainty have been omitted from the list. Paul Colburn (formerly of 9626 Oak Pass) has since identified a number of the other questionable species.

The NUMBERS used (1, 2, 3 or 4) indicate the relative abundance of the plants, compared with each other as they grew in the original undisturbed plant associations of the area. The LETTERS (CH, SS, OW, T; DS, DG, CL; sc, gr) give certain additional information on the various species, where applicable. The list is alphabetized, and the nomenclature follows Munz and Keck (1959).

The abundance-ratings and other annotations given in the list reflect conditions as they were in the locality between 1938 and 1955. Only where an apparent preference or tendency was observed are the appropriate letters included; they are otherwise omitted (as is often the case with DS, DG, or CL). In this locality, the various indicator-species for the three plant communities (CH, SS, and OW) were often very much intermingled; however, in certain localized patches throughout the area the formations were fairly "typical" and clear-cut, with a majority of the

indicator-species of one formation growing together. The species considered to be indicators for these three communities are listed by Munz and Keck (1959), pp. 13-17.

NUMBERS:

1 — originally ABUNDANT in the locality covered.
2 — originally of MODERATE ABUNDANCE; not particularly common, but by no means rare.
3 — originally SCARCE or rare.
4 — originally VERY SCARCE (only one or two plants known in the district). ("Originally" implies prior to 1955, when the area was still in a nearly undisturbed condition.)

LETTERS:

CH — occurring more often in the association having indicators of the CHAPARRAL community (as described by Munz and Keck, 1959, p. 17).
SS — occurring more often among indicators of the COASTAL SAGE SCRUB community (after Munz and Keck, pp. 13-14).
OW — occurring more often among indicators of the SOUTHERN OAK WOODLAND community (after Munz and Keck, pp. 16-17).
T — occurring throughout the area covered by this paper, without any apparent preferences in associations or soil types.
DS — growing more abundantly (in this locality) on more-or-less DISTURBED SOILS, along roadside edges, or on recently-burned areas, etc.
DG — showing an apparent preference (in this locality) for DECOMPOSED GRANITE soils, or similarly well-drained slopes, ridge-tops, and rocky places, etc.
CL — showing an apparent preference (in this locality) for the various heavier CLAY SOILS.
sc — growing primarily as SCATTERED individual plants; not usually grouped together.
gr — mostly in GROUPS, where several to many plants of the same species are growing in close proximity to one another.
sc–gr — sometimes growing in group associations, but also as isolated or scattered individuals among the other species.
* — before a species, indicates that the species is introduced (not native to this locality).

Adenostoma fasciculatum H. & A. (Rosaceae) — 1, CH, DG, gr.
This plant was abundant along Summitridge and Marion Way, but was only occasional down in the lower hills and heavier soils of Oak Pass (where oaks. *Salvia* spp., *Artemisia californica, Encelia,* and several members of the Chaparral association predominated).
**Amaranthus* sp. (Amaranthaceae) — 3, T, DS, gr.
Amorpha californica Nutt. (Leguminosae) — 3, CH, OW, sc.
Mostly in openings among oaks. Formerly not uncommon at several places along lower Oak Pass Road. Sweet-fragrant foliage.
**Anagallis arvensis* L. (Primulaceae) — 2, T, DS, gr.
Only a weed in gardens, where extra water is available during the summer drought.
Arctostaphylos glandulosa Eastw. (Ericaceae) — 3, CH, DG, sc.
Only on Peavine Ridge, except for a single large specimen that once grew on Summitridge near its intersection with Mulholland.
Artemisia californica Less. (Compositae) — 1, T, sc + gr. Abundant everywhere in the lower hills of Oak Pass Rd.; less common on DG of Summitridge. Superbly fragrant foliage.
Artemisia douglasiana Bess. in Hook. — 1, T, esp. OW, gr.
Mostly in ravines and canyon floors; usually in partial shade.
Artemisia dracunculus L. — 4, T, DS, gr.
Asclepias eriocarpa Benth. (Asclepiadaceae) — 2, T, gr.
(*Asclepias fascicularis* Dcne. in DC, not present).
Astragalus spp. (Leguminosae) — 2, CH, DS, CL, gr.
Oak Pass vicinity.
**Avena* sp. (Gramineae) — 2, T, gr.
Baccharis pilularis DC. ssp. *consanguinea* (DC.) *C.B. Wolf.* (Compositae) — 4, SS, sc.
Only one individual known in the area, between N. Beverly Dr. and Summit ridge Rd., S. of Mulholland.
Baccharis viminea DC. — 3, T, DS, sc + gr.
**Bidens pilosa* L. (Compositae) — 3, OW, sc + gr.
Bloomeria crocea (Torr.) Cov. (Amaryllidaceae) — 2, T, CL, sc + gr.
**Brassica geniculata* (Desf.) J. Ball. — 1, T, DS, sc + gr.
Abundant as a roadside weed, and blooming well into the dry season.
**Brassica nigra* (L.) Koch. — 1, T, CL, gr.
Particularly abundant on grassy open slopes.
Brickellia californica (T. & G.) Gray. (Compositae) — 2, CH, DG, sc.
Shows a particular inclination to grow on steep rocky cliffs, roadside cuts, etc., in sandstone and decomposed granite. Fragrant foliage.
Brodiaea pulchella (Salisb.) Greene. (Amaryllidaceae) — 1, T, CL, gr.
Usually on grassy slopes or hilltops.
Bromus spp. (Gramineae) — 1, T, gr.
Calochortus catalineae Wats. (Liliaceae) — 2, T, sc.
Calochortus clavatus Wats. — 4, DG, sc.
Camissonia californica (Nutt. ex T. & G.) Raven. (Onagraceae) — 3, CH, DG, DS. gr. (*Oenothera leptocarda* Greene).
**Capsella bursa-pastoris* (L.) Medic. (Cruciferae) — 2, T, DS, sc + gr.
Castilleja sp. (Scrophulariaceae) — 3, primarily CH, SS, sc.
One perennial species, occasional along Summitridge.

Ceanothus megacarpus Nutt. (Rhamnaceae) — 1, CH, DG, sc + gr.
Mostly on rocky slopes, but not in the heavier soils of Oak Pass. Flowering in Jan. and Feb. most years. Form either tall and slender or low, dense and shrubby.

Ceanothus spinosus Nutt, in T. & C. — 1, T, sc + gr.
Flowers usually white, occasionally pale blue. Flowering in March and April most years. Nearly reaching tree stature in ravines and north- or east-facing slopes.

**Centaurea melitensis L.* (Compositate) — 1, T, DS, gr.
Abundant on some open grassy slopes and hilltops.

Cercocarpus betuloides Nutt. ex T. & G. (Rosaceae) — 1, CH, DG, usually gr.
Growing rather tall, upright, and slender in this locality.

Chenopodium californicum (Wats.) (Chenopodiaceae) — 2, C, OW, sc.
The leaves peculiarly wet-farinose.

**Chenopodium* sp. (Chenopodiaceae) — 2, T, DS, sc + gr.
Roadsides and near gardens.

Chlorogalum pomeridianum (DC.) Kunth. (Liliaceae) — 2, T, sc.

Chorizanthe staticoides Benth. (Polygonaceae) — 2, CH, often DS, DG, gr.
Primarily along Summitridge, where it was locally abundant.

Cirsium sp. (Compositae) — 2, T, primarily DS.

Clarkia (Godetia) deflexa (Jeps.) Lewis & Lewis (Onagraceae) — 2, esp. OW, CH, often DS, gr.
A preference is shown for partially shaded banks or road-cuts. Common on North Beverly Dr. and upper Oak Pass.

Collinsia heterophylla Buist. ex Grah. (Scrophulariaceae) — 2, OW, CH, gr.

Convolvulus sp. (Convolvulaceae) — 2, CH, SS, primarily DS.
often abundant after fires. Corolla white.

**Conyza canadensis* (L.) Cronq. — 2, T, DS, sc + gr.

Cordylanthus filifolius Nutt. ex Benth. in DC. (Scrophulariaceae) — 1, SS, CH, DS, CL, gr.
Common near 9601 and 9626 Oak Pass, esp. on ± disturbed soil in dry openings among *Artemisia californica* and *Salvia mellifera.*

Corethyrogyne filaginifolia (H. & A.) Nutt. vars. (Compositae) — 1, T, sc + gr.
There were two distinctly different varieties growing in this locality; those with the entire plant white-tomentose were more abundant throughout the area.

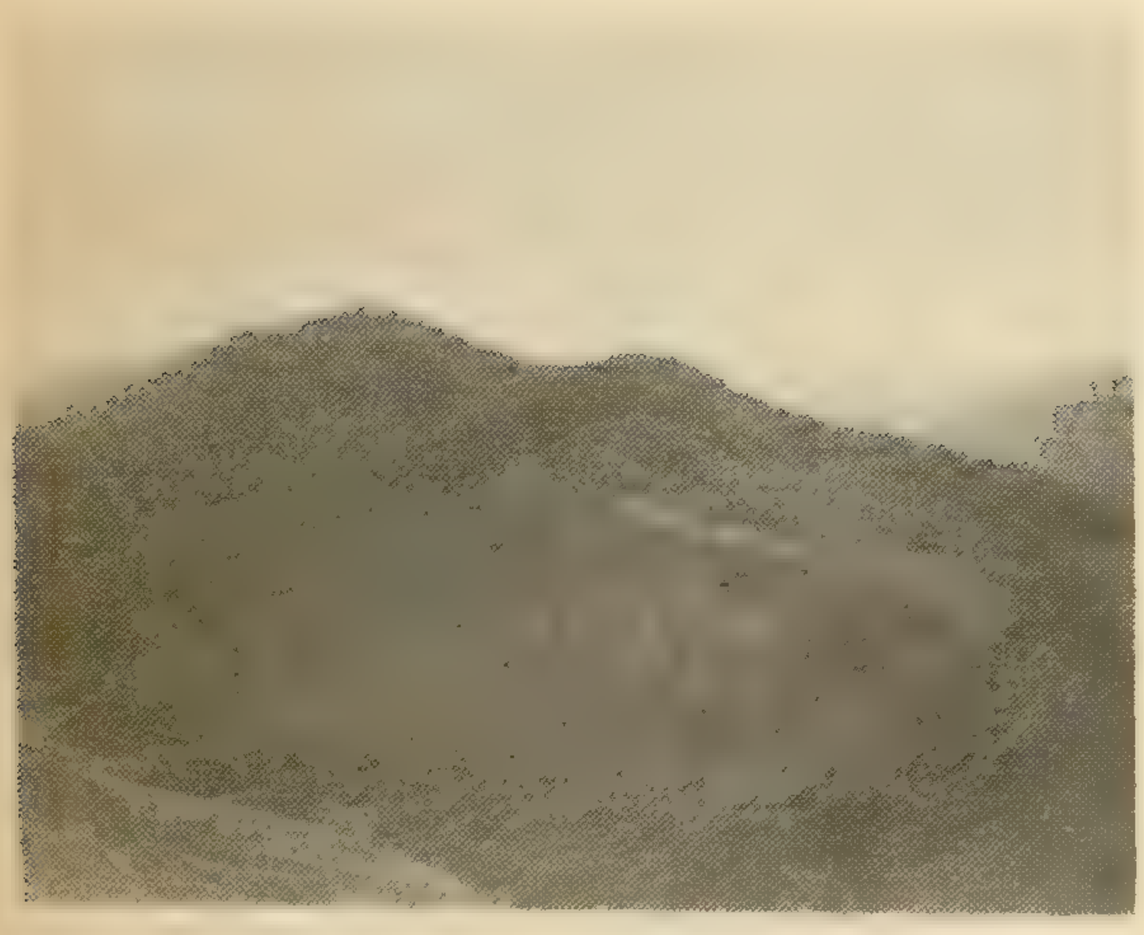
Cuscuta californica H. & A. (Cuscutaceae) — 2, T, sc + gr.
On various low plants, such as *Eriogonum fasciculatum.*

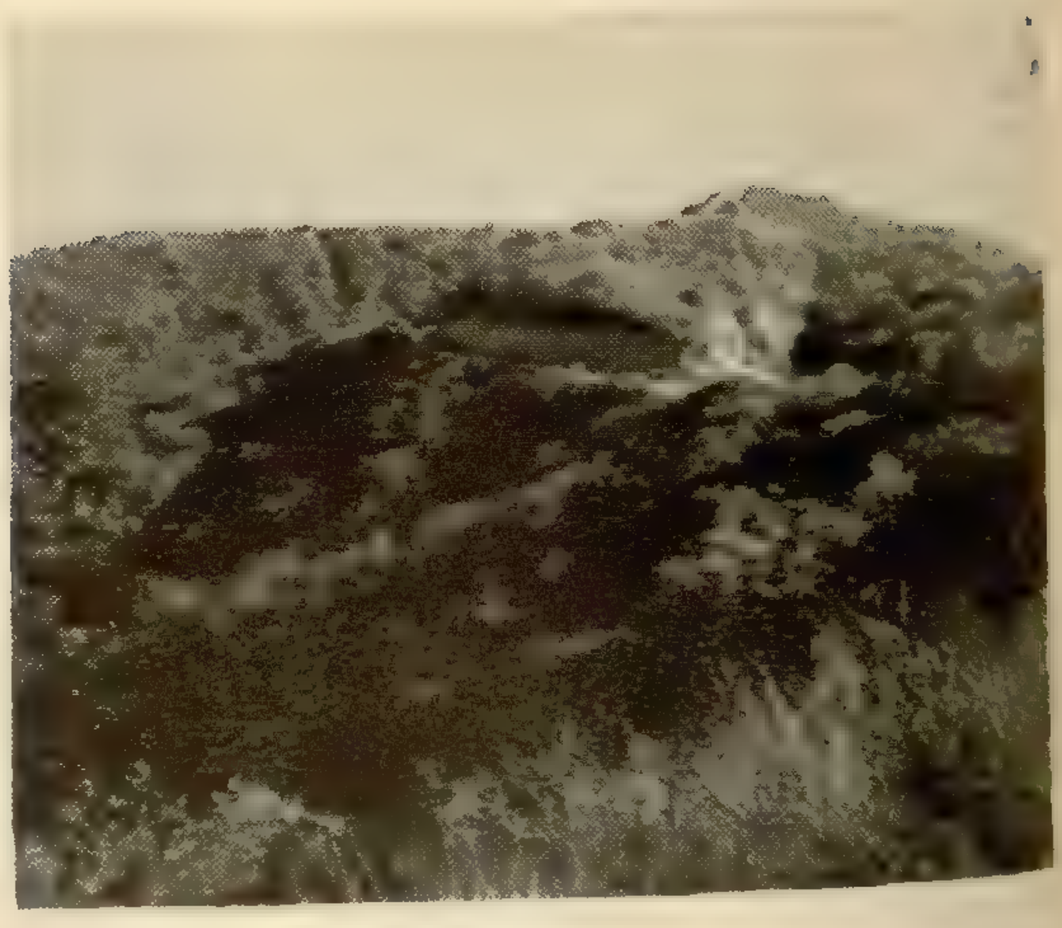
Cuscuta subinclusa Dur. & Hilg. — 1, T, sc + gr.
Particularly on *Ceanothus spinosus* and *Rhus laurina;* also on other shrubs.

Delphinium cardinale Hook. (Ranunculaceae) — 2, CH, DG, gr.
Particularly in openings between *Adenostoma* bushes, where the latter were nearly covering the ridges and hilltops, in rocky soil or DG: also among *Cercocarpus* bushes in similar situations. Elsewhere scattered and less common.

Dendromecon rigida Benth. (Papaveraceae) — 4, CH, sc.
Only one individual was known in this locality, on Mulholland near the Benedict Canyon intersection; it was growing out of the sandstone of a vertical road-cut.

Dudleya lanceolata (Nutt.) Britt. & Rose. (Crassulaceae) — 2, SS, CH, gr.
Usually under or among small shrubs *(Eriogonum, Encelia, Salvia,* etc.), particularly on steep east- or west-facing rocky slopes. Summitridge Road, Marion





CHARACTERISTICS OF VEGETATION and terrain of the Santa Monica Mountain territory covered in this article can be seen in the four photographs above, all of which were taken in the mid-1950s before fires and subdivisions altered the area: *Top left* shows upper end of Peavine Canyon and Peavine Ridge as seen from Peavine Peak; *top right* is a view south toward the junction of Oak Pass and Summitridge Dr.; *bottom left* shows No. Beverly Dr. as it appeared just south of its junction with Mulholland Dr., with a well-established grove of *Eucalyptus glomerata* in the middle distance; *below right* is another photograph of Beverly Dr., near Marion Way; the trees here are *Platanus racemosa*.

PHOTOGRAPH TAKEN IN 1938, LOOKING NORTHWEST from upper Oak Pass Road (DG soil), near its junction with Summitridge Road; the house in middle-distance is at 9601 Oak Pass. The ridge on the western horizon is upper Beverly Glen, and slightly below that may be seen the newly-constructed northernmost section of Benedict Canyon Drive where it climbs onto a ridge just south of Mulholland. A chaparral association covers the slopes in the foreground. Large, healthy trees *(Quercus agrifolia)* dominate around and below the house, and in the ravines everywhere nearby. Lighter patches in the vegetation represent mostly Coastal Sage Scrub indicators, with some admixture of Chaparral species. Far to the WSW may be seen one of the grassy-open walnut-hillsides referred to in the text. The house is at an elevation of about 1100 feet, and is 10 miles (in a direct line) inland from the coast.

Way, and near 9720 Oak Pass Road.

Elymus condensatus Presl. (Gramineae) — 1, T, sc + gr.
Often abundant after fires for the first few years while a burned area is recovering. At 9601 Oak Pass Road the flowering spikes often surpassed 15 feet in length on DS heavy clay soil.

Emmenanthe penduliflora Benth. (Hydrophyllaceae) — 2, T, DS, sc.
Sometimes common for a few years on recently-burned hillsides.

Encelia californica Nutt. (Compositae) — 1, primarily SS, CH, primarily CL, sc + gr.
Very abundant at 9601 Oak Pass and along the northern end of Summitridge to Mulholland, etc.

Eremocarpus setigerus (Hook.) Benth. (Euphorbiaceae) —4, primarily DS, sc + gr.

Eriogonum elongatum Benth. (Polygonaceae) — 2, T, CL, gr.
Particularly along upper Oak Pass and Summitridge north of Marion Way.

Eriogonum fasciculatum Benth. — 1, T, primarily CH, primarily DG, sc + gr.
Leaf length, width, color, and degree of pubescence variable in this locality; forms with a dark green, glabrate upper surface of leaf were predominant on DG. On sandstone, around Oak Pass, was a paler green and more evenly pubescent form which was uncommon. (Few specimens were growing on soil other than DG in this locality.)

Eriophyllum confertiflorum (CD.) Gray, (Compositate)—1, T, primarily CH, often DS, primarily DG, sc.
Mostly along upper Oak Pass and Summitridge.

**Erodium* spp. (Geraniaceae) — 1, T, primarily DS, gr.
Two species were present; a taller-growing and more upright, pale-stemmed species was less common than the smaller, abundant, red-stemmed species.

Eschscholzia californica Cham. (Papaveraceae) — 3, CH, DS, DG, gr.
Petals yellow-orange. In this locality recorded only from one west-facing slope near the intersection of upper Oak Pass with Summitridge Road.

**Eucalyptus globulus* Labill. (Myrtaceae) — 2, CH, OW, sc + gr.
Mostly planted older trees in canyons, but an old, deserted grove on upper North Beverly Dr. had associated with it several very young trees in good condition. These had established themselves in the floor of the canyon without any assistance from man.

**Euphorbia peplus* L. (Euphorbiaceae) — 2, OW, CH, DS, gr.
Roadsides and near gardens, usually in semi-shade.

**Foeniculum vulgare* Mill. (Umbelliferae) — 4, T, DS, sc.
Only two clumps were known in the area — one near 9626 Oak Pass and the other near the junction of upper Oak Pass and Summitridge Roads.

Fritillaria biflora Lindl. (Liliaceae) — 3, T, primarily SS-OW borders, CL, sc.
On a grassy slope, bordered by a *Quercus dumosa* thicket, just west of the house at 9720 Oak Pass Road (probably no longer present).

Galium angustifolium Nutt. in T. & G. (Rubiaceae) — 2, T, sc.
This species and the one that follows were fairly abundant along upper Marion Way; also scattered throughout.

Galium nuttallii Gray. — 2, T, sc.

Geranium carolinianum L. (Geraniaceae) — 3, esp. OW, DS, sc.
Only occasional.

Gilia angelensis V. Grant (Polemoniaceae) — 2, CH, DG, gr.
Locally abundant along Summitridge Road, in openings amongst *Cerocarpus*

and *Adenostoma,* esp. near the east end of Peavine Ridge (area now destroyed by subdividers).

Gnaphalium bicolor Bioletti. (Compositae) — 2, T, esp. OW, DS, sc.

Superbly fragrant foliage.

Gnaphalium californicum DC. — 2, T, DS, sc.

Gnaphalium microcephalum Nutt. — 1, CH, often DS, DG, sc.

A preference is shown for rocky cliffs and cut-banks along DG roads. Formerly abundant along rocky road-cuts of upper Oak Pass, the middle section of Summitridge Road, and all of Marion Way.

Grindelia robusta Nutt. (Compositae) — 2, SS, CH, CL, sc + gr.

A small colony was for many years near 2500 Summitridge Road (near the Marion Way intersection).

Haplopappus squarrosus H. & A. ssp. *grindelioides* (DC.) Keck. (Compositae) — 1, T, sc.

Haplopappus venetus (HBK.) Blake ssp. *vernonioides* (Nutt.) Hall — 2, SS, CH, sc.

Haplopappus sp. — 4, DS, on sandstone road-cut near 9720 Oak Pass.

Helianthemum scoparium Nutt. var. *vulgare* Jeps. (Cistaceae) — 3, CH, DG, gr.

Known only on Peavine Ridge in this locality, where it was not uncommon.

Hemizonia ramosissima Benth. (Compositae) — 2, SS, CH, CL, DG, usually DS, gr.

Common at roadside from upper Oak Pass to the Marion Way - Summitridge intersection; esp. near 2500 Summitridge Road. Distinctive fragrance.

Hesperocnide tenella Torr. (Urticaceae) — 2, OW, CH, gr.

Mostly on semi-shaded grassy slopes, under *Cercocarpus,* along upper Oak Pass and Summitridge.

Heteromeles (Photinia) arbutifolia M. Roem. (Rosaceae) — 2, T, primarily CH, always sc.

In the 1940s, the areas of upper Oak Pass, the middle section of Summitridge, and Marion Way were magnificently colored by the winter display of berries from a large population of fine specimens. Truck-loads of the branches with berries were hacked from the toyon in this vicinity year after year, presumably by people intending to sell the berries for decorative purposes.

Juglans californica Wats. (Juglandaceae) — 1, T, sc + gr.

Often growing in irregular groups on (and bordering) open grassy slopes; otherwise sc.

**Lactuca serriola* L. (Compositae) — 4, T, DS, sc.

Lathyrus laetiflorus Greene ssp. *barbarae* (White) C. L. Hitchc. (Leguminosae) — 2, T, usually CL, sc.

Leptodactylon californicum H. & A. (Polemoniaceae) — 2, CH, DG, sc + gr.

A preference is shown for DG cliffs and road-cuts, or rocky soil on steep slopes. Along the middle section of Summitridge to upper Marion Way and south along N. Beverly Drive.

Lonicera subspicata H. & A. var. *johnstonii* Keck. (Caprifoliaceae) — 1, T, more often CL, sc.

In shade of oaks, *Rhamnus crocea,* or *Rhus laurina,* etc., it becomes a climbing, woody vine; in open sunny situations it remains a compact, intricate tangle of woody stems, which originally grow up but finally arch back down into the clump again, adding to its compactness.

Lotus scoparius (Nutt. in T. & G.) Ottley. (Leguminosae) — 1, T, DS, sc + gr.

Assuming a "straggly" growth habit among other small shrubs, projecting up

among them and living for many years; in the open, quite compact and rounded in outline. Often common after fires or on recently-cleared areas.

Lupinus hirsutissimus Benth. (Leguminosae) — 3, T, DS, sc + gr.

Lupinus longifolius (Wats.) Abrams. — 2, T, often CL, sc.

Lupinus succulentus Dougl. ex Koch. — 1, SS, CH, always CL, mostly gr.

Was abundant near 9626 Oak Pass; now entirely destroyed.

Lupinus truncatus Nutt. ex H. & A. — 3, T, DS, sc + gr.

Malacothamnus fasciculatus (Nutt.) Greene. (Malvaceae) — 4, sc.

A single bush known between 9601 and 9626 Oak Pass.

Malacothrix saxatilis (Nutt.) T. & G. var.? (Compositae) — 2, CH, DG, sc.

Primarily in rocky DG along road-cuts.

**Malva parviflora* L. (Malvaceae) — 1, T, often CL, only DS, sc + gr.

Marah macrocarpus (Greene) Greene. (Cucurbitaceae) — 1, T, usually CL, sc.

The luxuriant green stems and leaves soon wilt with the early summer heat: the pale brown shrivelled stems and leaves, draped over shrubs and hanging across trails, become a characteristic feature in the vegetation during the dry season. Particularly common near 9601 Oak Pass.

**Marrubium vulgare* L. (Labiatae) — 1, T, DS, sc + gr.

**Medicago polymorpha* L. (Leguminosae) — 2, T, DS, gr.

A weed in gardens, particularly where watering continues through the summer.

Melica imperfecta Trin. (Gramineae) — 1, T, gr.

**Melilotus albus* Desr. (Leguminosae) — 3, T, DS, gr.

Local near 9626 Oak Pass, where it was originally introduced for honeybees.

**Melilotus indicus* (L.) — 1, T, DS, gr.

Mentzelia micrantha (H. & A.) T. & G. (Loasaceae) — 3, CH, DS, DG, gr.

Along Summitridge south of the upper Oak Pass intersection.

Mimulus (Diplacus) longiflorus (Nutt.) Grant. (Scrophulariaceae) — 1, T, sc + gr.

Often growing densely together, in open glades among oaks; also in large patches on slopes, among other shrubs. Spectacular displays (when in flower) were near 9601 Oak Pass Road, and along N. Beverly Drive north of Marion Way. Superbly fragrant foliage.

Mirabilis laevis (Benth.) Curran. (Nyctaginaceae) — 3, T, sc.

Usually on sandstone or rocky banks or road-cuts.

Montia perfoliata (Donn) Howell. (Portulacaceae) — 1, T, primarily OW, gr.

Nemophila menziesii H. & A. (Hydrophyllaceae) — 3, primarily OW gr.

Mostly in semi-shade under oak trees. Sometimes luxuriant after winters of heavy rain. Seasonal only.

In semi-shade beneath oaks near 9601 Oak Pass.

Nicotiana glauca Grah. (Solanaceae) — 1, T, often DS, sc + gr.

Shows a preference for rocky DG cliffs and road-cuts, etc., but grows also on other soils throughout the area.

Orthocarpus purpurascens Benth. (Scrophulariaceae) — 3, SS, CH, gr.

A small colony on ± disturbed clay soil near 9626 Oak Pass.

Oxalis sp. (Oxalidaceae) — 3, T, usually DS, sc.

Petals yellow.

Paeonia californica Nutt. ex T. & G. (Paeoniaceae) — 2, T, esp. CH and OW, often CL, sc.

Fairly common around 9601 Oak Pass.

Penstemon cordifolius Benth. (Scrophulariaceae) — 1, T, primarily CH, sc.

Its growth habit is much like that of *Lonicera subspicta* var. *johnstonii*, and

its form varies similarly, according to the situation where it grows. Superb "cascades" of this plant covered slopes of lower Marion Way and N. Beverly Drive.

Penstemon heterophyllus Lindl. — 4, CH, DS, CL.
Known only from two or three plants growing for many years on a road-cut at 9626 Oak Pass (in full sun, on pale-colored, heavy clay soil).

Penstemon spectabilis Thurb. ex Gray. — 2, CH, primarily DG, usually DS, sc + gr.
In this locality primarily restricted to cleared DG areas (roadsides), or rocky ridges and (particularly) fire-breaks; was common on Peavine Ridge and elsewhere along Summitridge Road (on the higher rocky ridges).

Perezia microcephala (DC.) Gray. (Compositae) — 2, T, primarily CH, often DS, sc.
Not uncommon near 9601 Oak Pass. A favored foodplant for the nymphal stages of a common local katydid.

Phacelia spp. (Hydrophyllaceae) — 2, SS, CH, DS, gr.
More frequent on burned areas (for a few years after the fire), on open slopes or ridges. Rare in undisturbed chaparral. (Probably 2 spp.).

Pholistoma (Nemophila) auritum (Lindl.) Lilja. (Hydrophyllaceae) — 2, T, primarily OW, sc.
Not uncommon along lower Oak Pass Road, under oaks.

Dense covering of healthy live oaks *(Quercus agrifolia)* at 9601 Oak Pass Rd. typified region in 1937. For a larger view of this area, see page 9.

Phoradendron flavescens (Pursh) Nutt. var. *macrophyllum* Engelm. in Rothr. (Loranthaceae) — 1, T, sc.

Common on *Juglans* on the slopes and ridges, and on *Platanus* in the canyons.

Platanus racemosa Nutt. (Platanaceae) — 2, CH, OW, sc + gr.

In the major canyons; never on the slopes or ridges. A well-established group along N. Beverly Drive at the Marion Way intersection.

Potentilla glandulosa Lindl. (Rosaceae) — 2, T, often DS, sc.

Prunus ilicifolia (Nutt.) Walp. — 2, CH, usually DG, always sc.

Mostly along upper Oak Pass and Summitridge.

Quercus agrifolia Neé. (Fagaceae) — 1, T, sc + gr, (usually gr).

Once abundant and in excellent condition (with DARK green leaves) throughout the area. The trees are now (1964) in very poor condition, many of them dying or already dead and fallen throughout the area. Many of the larger old trees that grew on hills and slopes above the canyons have died since 1950, as well as numerous individuals in Benedict Canyon. The prolonged drought of recent years, and the increasing smog, probably are both partly responsible. *Phryganidia californica* Pack. (Dioptidae), the California oak moth, has been living in equilibrium with *Q. agrifolia* for centuries before the arrival of man on the scene, and thereby cannot be held responsible for the decline of these trees, despite what the peddlers of insecticides would have us believe. Spraying for these moths will only (at best) prolong the slow death of the oaks, but will not save them. A change to another cycle of wet years (if it comes soon) might save those remaining oaks that still retain the vigor to recover. For evidence of the abundant, healthy, dark green oaks that once grew along Oak Pass, and throughout the canyons and ravines of the whole area, see the photograph taken in 1938 (p. 9). In DG and rocky soils they were confined mostly to the north sides of steep slopes and ravines, but on the lower rounded hills, in heavier soils and in canyons, they were abundant everywhere.

Quercus dumosa Nutt. — 2, primarily CH, OW, usually gr, rarely sc.

A few dense thickets of limited extent, and smaller groups, on ridges and hillsides.

Rafinesquia californica Nutt. (Compositae) — 1, T, DS.

Particularly common after fires, and on DS (along roadsides) at all times, in full sun and semi-shade.

Ranunculus sp. (Ranunculaceae) — 3, SS, CH, CL, gr.

Perennial. One small colony known, on an open grassy slope near 9540 Oak Pass; this area now destroyed.

Raphanus sativus L. (Cruciferae) — 4, SS, sc.

Rhamnus californica Esch. (Rhamnaceae) — 3, OW, CH, sc.

One known near the house at 9540 Oak Pass (now destroyed); a few along N. Beverly Dr. near its intersection with Marion Way.

R. crocea Nutt. in T. & G. ssp. *ilicifolia* (Kell.) C. B . Wolf. — 1, T, sc.

In this locality it often assumes the stature and physiognomy of a "dwarf tree," with rather long trunks (4" or more in diameter), and a somewhat open growth; in open places in the full sun (away from close contact with other large shrubs) it assumes a much more dense and rounded form.

Rhus diversiloba T. & G. (Anacardiaceae) — 1, T, sc + gr.

In the shade, usually vine-like and often climbing high into the oaks *(Quercus agrifolia)*. In the open, usually shrubby and compact in growth habit. BOTH forms can come from the SAME plant, depending upon the situation in which new sprouting shoots find themselves.

Rhus integrifolia (Nutt.) Benth. & Hook. — 3, SS, CH, sc.
In this immediate locality, occurring only as a few isolated specimens, particularly in the N. Beverly Drive - Marion Way area and in Franklin Canyon.
Rhus laurina Nutt. in T. & G. — 1, T, primarily sc.
Often reaching large size, but always shrub-like in form. Lower stems often 5" or more in diameter. Extremely strong-smelling foliage (when crushed).
Rhus ovata Wats. — 2, T, always sc.
A compact shrub; not uncommon from 9601 to 9626 Oak Pass, and scattered generally throughout.
Rhus trilobata Nutt. ex T. & G. var. *malacophylla* (Greene) Munz. — 2, T, sc + gr.
The leaves softly-pubescent. Often growing in a tangled semi-shrub form. Often in partial shade or ± protected locations.
Ribes malvaceum Sm. var. *viridifolium* Abrams (Saxifragaceae) — 1, T, sc.
Superbly fragrant foliage.
Ribes speciosum Pursh. — 1, T, sc.
Particularly on north-facing slopes and hilltops. Abundant near 9601 Oak Pass and north of Marion Way.
**Ricinus communis L.* (Euphorbiaceae) — 3, DS, sc.
A few, in Benedict Canyon only, prior to 1955.
Rosa californica Cham. & Schlecht. (Rosaceae) — 4, OW, CL, gr.
Only one clump known, near junction of Hutton Dr. and Oak Pass Road; destroyed about 15 years ago.
Rubus ursinus Cham. & Schlecht. (Rosaceae) — 3, OW, gr.
In the canyon along N. Beverly Drive at the Marion Way intersection, growing under sycamores.
Rumex crispus L. (Polygonaceae) — 3, T, DS, sc.
Rare weed at roadsides.
Salix laevigata Bebb. (Salicaceae) — 2, T, sc + gr.
In canyons, particularly along N. Beverly Drive south of the Marion Way intersection.
Salix lasiolepis Benth. — 2, T, sc.
Fairly common in Benedict Canyon; occasional elsewhere.
Salsola kali var. *tenuifolia* Tausch. (Chenopodiaceae) — 4, T, DS, primarily CL, sc.
Salvia apiana Jeps. (Labiatae) — 1, T, primarily SS, primarily sc.
Strong-smelling foliage.
Salvia leucophylla Greene. — 4, SS, sc + gr.
Never recorded within the limits of the area under consideration, but rather common along Mulholland Dr. some distance west of its intersection with Beverly Glen. A single plant that appeared to be a hybrid *(leucophylla* X *apiana)* was growing for many years near 9601 Oak Pass Road; no other plants comparable to this one were ever seen in the locality. Fragrant foliage.
Salvia mellifera Greene. — 1, primarily SS, CH, primarily gr.
Extremely abundant at 9601 Oak Pass. Strong-smelling foliage.
Salvia spathacea Greene. — 1, primarily OW, CL, always gr. Forms small colonies in the semi-shade of openings among oaks, and (less often) among the larger chaparral shrubs. Fragrant foliage.
Sambucus mexicana Presl. (Caprifoliaceae) — 2, T, sc.
Some older specimens reached an almost tree-like stature, with heavy trunks,

Sanicula arguta Green ex Coult. & Rose. (Umbelliferae) — 1, T, mostly CL, sc.
Scrophularia californica Cham. & Schlecht. (Scrophulariaceae) — 3, CH, OW, sc + gr.
Fairly common along N. Beverly Drive (canyon floor, north of Marion Way intersection).
Senecio douglasii DC. (Compositae) — 3, CH, DS, usually DG, sc.
**S. mikanioides Otto.* — 4, OW, sc.
A few escaped; in Benedict Canyon only.
Silene laciniata Cav. ssp. *major* Hitchc. & Maguire. (Caryophyllaceae) — 2, OW, primarily CH, primarily DG, CL, sc.
A preference is shown for semi-shaded cut banks along roadsides, particularly in a DG-CL soil; they were originally rather common along the cut banks of N. Beverly Dr., Marion Way, and upper Oak Pass near the Summitridge intersection.
Sisyrinchium bellum Wats. (Iridaceae) — 2, T, CL, gr.
Primarily in grassy openings among CH and SS shrubs. Fairly common near 9601 Oak Pass, and north of upper Marion Way well above N. Beverly Drive.
Solanum douglasii Dunal in DC. (Solanaceae) — 2, T, sc.
A preference is shown for semi-shady locations on hills and in canyons.
Solanum xantii Gray var. *intermedium* Parish. — 1, T, sc + gr.
Especially on heavier soils.
Stachys sp. (Labiatae) — 2, T, sc + gr.
Usually in semi-shaded ravines and canyons, or on north-facing slopes under large shrubs.
Stephanomeria cichoriacea Gray (Compositae) — 2, CH, DG, sc.
Primarily in rocky DG and along road-cuts.
Stephanomeria virgata Benth. — 2, T, DS, sc + gr.
Stipa sp. (Gramineae) — 1, T, esp. CH.
Symphoricarpos mollis Nutt. in T. & G. (Caprifoliaceae) — 2, T, primarily OW, sc + gr.
In semi-shade of oaks, or under other shrubs; particularly on north-facing slopes or oak-covered hilltops.
Tragopogon porrifolius L. (Compositae) — 4, T, DS, sc + gr.
A few individuals growing for many years on a grassy walnut-slope near 9540 Oak Pass; one or two elsewhere.
Trichostema lanatum Benth. (Labiatae) — 3, CH, usually DS, DG, sc.
Occasional on firebreaks, and along Summitridge. Sweet-fragrant foliage.
Urtica holosericea Nutt. (Urticaceae) — 4, CH, gr.
A few plants in the (dry) stream-bed, on upper N. Beverly Drive.
Venegasia carpesioides DC. (Compositae) — 2, T, primarily OW, sometimes DS, DG, CL, sc.
Often on steep road-cuts, canyon walls, and in ravines; usually in semi-shade, and/or on north-facing slopes.
Verbena lasiostachys Link. (Verbenaceae) — 3, T, usually DS, sc + gr.
Usually in a roadside ditch, where water takes longer to dry up, or near a leaking pipe, etc.
Yucca whipplei Torr. ssp. *intermedia* Haines. (Liliaceae) — 1, T, primarily SS and CH, sc.
Zauschneria cana Greene. (Onagraceae) — 1, T, primarily CH and OW, often DG, DS, sc.
Often growing from steep rocky sandstone (or DG) road-cuts.

OAK PASS Road, showing *Quercus agrifolia,* about 1945.

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Book Review

Plants and Archaeology, by G. W. Dimbleby. 187 pp. Illustrated. Bibliography and index. John Baker, London, 1967. $7.00.

This first book to deal exclusively with the botanic aspects of archeology surveys the field for both layman and scientist. British ecologist and anthropologist Dimbleby predicts a greater emphasis on plant materials, too-often disregarded in reconstructing man's past. With the development of radiocarbon dating, and improved methods of microsectioning of charcoal, plant evidence available for interpretation has shown a marked increase.

Section one of the book is a comprehensive outline of the economic uses of plants, be they timber rollers used in pyramid building or sandy, tannin-leached acorns causing poor teeth.

Of especial interest is the section describing the kinds of plant materials yielded by archaeological sites. Conditions which favor the preservation of plant materials are explained. Wood structures, including the all-important charcoal forms, are presented in detail, with good microphotographs. Impressions, fossil faeces and fibres, which supplement the more evident seed and fruit remains, enlarge our view of this fascinating field of study.

In interpreting evidence offered by prehistoric plants, the author's emphasis lies not only in man's uses of plants, but in the landscapes man has occupied and altered over the centuries. Plant chronology, a chief interest of all archaeologists, incorporates tree ring dating, useful especially in arid regions. Pollen analyses of materials layered in water-logged situations reveal diagnostic dating assemblages. The less-than-twenty-year-old method of measuring residual radioactive carbon reaches more elusive evidence of age.

The detailed bibliography and index complete this journey into the botanical past in which the author stresses the wide relationships between archaeobotany and other sciences.

—Lydia S. Bowen

With Leaves Like a Duck's Foot!

By Edward Pugh

Among the collection of historic trees that crowd the Arboretum Mall area, none has a more fascinating history than the ginkgos.

Ginkgo biloba is the oldest of existing types of trees; the sole survivor of a more numerous group in early geologic times; a tree whose ancestors were thriving one hundred and twenty-five million years ago when terrible reptiles roamed the earth, and the pterodactyl ruled the skies. Ginkgos, limited eventually to Asia, once flourished (and fossils bear this out) in western Europe, northern California and Oregon, Greenland and other parts of the world. Today, they are "relics," or "living fossils," existing, it is believed, only as a cultivated tree. Botanically, "maidenhair trees," as they are commonly called, form a link between the Yew family, the Cycads, the Ferns and allies.

The earliest written mention of the Ginkgo appeared in a Chinese Agricultural work of the Eighth Century. In 1578, the tree was listed in what was known as *The Great Chinese Herbal* as Ya-chio-tzu or "The tree with leaves like a duck's foot."

Korean and Chinese Buddists are credited with the introduction of the ginkgo into Japan. In fact the generic name ginkgo is the Japanese rendering of the Chinese name Yin-kou. Many magnificent specimens of ginkgo may be seen in Japan today, some up to 100 feet or more in height and from 18 to 25 feet in girth. A number of these behemoths are said to be more than a thousand years old. They are generally found in association with temples, shrines or palaces. In the Orient, ginkgo seeds are roasted and known as a dessert nut. The Chinese call them silver fruit.

The ginkgo came West through the efforts of Engebert Kaempfer, a surgeon with the Dutch East-India company who, in 1712 after a visit to Japan, published a book in which he described the tree.

An Englishman by the name of Gordon was the first to send a living maidenhair tree to the great botanist Linnaeus, but it was the Dutch, again, who actually introduced this ancient plant into Europe, sometime between 1727 and 1737. Seventeen years later ginkgos had reached England with the first tree flowering in Kew Gardens in 1795.

William Hamilton is credited with the introduction of the maindenhair tree to America. He imported a specimen from England in 1784 for his garden at Woodlands near Philadelphia. This was sixty-six years before California became a state. The estate has since become Woodlands Cemetery in which this ginkgo is reportedly still growing.

In California, ginkgos were first listed in a San Francisco nursery catalog during the late 1850s and were in the Los Angeles area probably by 1870.

Seven specimens of ginkgo grow in the Mall at the Arboretum. Six around the Coach Barn — one across the road on the edge of the Herb Garden. This last tree is a rare weeping or pendulous species illustrated by the accompanying sketch and

known as pendula form by botanists. This larger male specimen measures 19″ in diameter and is 90 feet tall.

These trees were planted by "Lucky" Baldwin, presumably from seed obtained in the Orient between 1875 and 1880. This would have placed them among the first trees to be set out on his Rancho Santa Anita after the purchase of the ranch in 1875. Baldwin was enthusiastic about plants and his gardens were replete with floral beauty collected around the world.

The National Shade Tree Conference recommends the ginkgo as a street tree for southern California for numerous reasons. First, it is one of the few deciduous trees in southern California which shows beautiful butter-yellow foliage in the fall and attractive branching during the leafless periods. Second, the tree with its robes of bright green foliage is stately and ruggedly picturesque. Third, the tree is as tough as they come, withstanding smoke, smog, dust, drought and frost.

THIS MONTH'S COVER PLANT

ARBORETUM INTRODUCTION — 1965

Common Name	: Cape Weed
Botanical Name	: *Arctotheca calendula* (L.) Levyns
Family	: Compositae
Origin	: South Africa
Form	: Ground cover, 4 to 6 inches high.
Flowers	: Bright yellow heads, 2¼″ diameter.
Foliage	: Evergreen, deeply divided. Dark green and hairy on upper side — silvery underneath.
Growth Rate	: Rapid — where ample moisture is available. Roots at nodes.
Soil Requirement	: Tolerant of variety of soils.
Exposure	: Full sun to very light shade.
Temperature Tolerance	: Subject to frost but recovers rapidly.
Water Needs	: Moderate — but is apparently very tolerant of wide range from little to much moisture.
Pruning	: Only to keep within desired area.
Pests	: May be occasionally attacked by caterpillars.
Disease	: None of record.
Propagation	: Seed, cuttings, or divisions. Cuttings are most rapid method and root readily.
Remarks	: This plant should be given serious consideration as a ground cover for difficult to maintain areas. Its tolerance of much or little moisture indicates wide adaptability. This plant was distributed to Foundation members at the 1965 Annual Meeting. It also was released to nurserymen that year.

FLOWER SHOW DATES — 1968

February 24, 25, 1968	Temple City Camellia Show
March 30, 31	Aril Society International Show
April 5, 6, 7	Southland Orchid Show
April 12, 13, 14	Spring Flower Show and Art Festival
April 20, 21	Iris Show
April 27, 28	Amaryllis Show
May 11, 12	Geranium Show
May 19	Epiphyllum Show
May 25, 26	Bonsai Exhibit
June 21, 22, 23	Gladiolus Show
July 4, 5, 6, 7	Cactus and Succulent Show
July 20, 21	Begonia Show (San Gabriel Valley Branch)
October 31-Nov. 1, 2	Fall Flower Show

Plant Societies holding regular meetings at the Arboretum:

American Begonia Society	Second Friday — 7:30 p.m.
Arcadia Garden Club	Third Thursday — 10:30 a.m.
Arcadia Historical Society	Stated Thursdays — 7:30 p.m.
Aril Society	Stated Sundays — 1 p.m.
Cactus and Succulent Society	Third Wednesday — 7:30 p.m.
Cymbidium Society	Fourth Tuesday — 7:30 p.m.
Daffodil Society	Third Sunday — 12 noon
Herb Society	Stated Meetings
Iris Society (Southern California)	Third Saturday — 11 a.m.
Pasadena Horticultural Society	Third Tuesday — 7:30 p.m.
Santa Anita Bonsai	Third Saturday — 7:00 p.m.
San Gabriel Valley Orchid Hobbyists	Third Thursday — 7:30 p.m.
Southern California Gladiolus Society	4-22-68 — 7:30 p.m.
Southern California Hemerocallis and Amaryllis Society	Third Saturday — 10 a.m.
Temple City Camellia Society	3-28-68 — 7:30 p.m.

RECENT ACQUISITIONS OF LASCA LIBRARY

Annual Review of Plant Physiology, Vol. 18. 1967. Annual Reviews, Inc., Palo Alto, California

A group of research papers representative of the most recent work in the field of plant physiology.

Crane, Lorence Hedleston. *Flowers and folk-lore from far Korea.* 92 p. 1931. The Sanseido Co., Ltd., Tokyo.

Beautifully illustrated in color, this sensibly arranged volume incorporates poetry, proverbs and economic notes.

Hutchinson, J. *The Genera of flowering plants. Dicotyledons,* Vol 2. 659 p. 1967. Oxford University Press, London

A continuation of the scholarly first volume, this book is a must for taxonomists.

Seventeenth International Horticultural Congress Proceedings. 4 Vols. 1967.

A review of the meetings of August 15-20, 1966, held at the University of Maryland.

Lichten, Frances. *Decorative art of Victoria's era.* 274 p. 1950. Charles Scribner's Sons, N.Y.

This profusely illustrated summary of the era exemplified in the household of Lucky Baldwin has an excellent bibliography and index.

Lillard, Richard G. *Eden in jeopardy.* 329 p. 1966. Alfred A. Knopf, N. Y.

A conservation warning with much local significance in these subdivision-happy times.

Mirov, N. T. *The Genus Pinus.* 602 p. 1967. The Ronald Press Company, N. Y.

This comprehensive work which covers the biology of pines as well as their taxonomy contains many fine bibliographies and detailed index.

Rogers, Cameron. *Trodden glory — the story of the California poppy with a description of some Russians.* 130 p. 1949. Wallace Hebberd, Santa Barbara.

Menzies, Douglas, and Von Chamisso, who named *Eschscholtzia* in honor of the surgeon-naturalist Johann Friedrich Eschscholtz who traveled with Russian expeditions, explore the West Coast.

Whittle, Tyler. *Some ancient gentlemen.* 224 p. 1965. Heinemann, London.

A literary and horticultural expert scatters many a practical tip through his book of delightful essays on garden history.

— LYDIA S. BOWEN

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THE COVER

MYELLA is fitting reward for eight generations' breeding by its hybridizer, Ross H. Gast. The flower is geometrically perfect in form and color distribution, a difficult genetic combination to achieve. It is also a precocious and prolific bloomer. The plant is of medium height, and a strong grower on a good root. It will be introduced by the Arboretum this year.

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the Editor's Page

READERS familiar with LASCA LEAVES will note a new look about this issue and may wonder if it has meaning beyond that which meets the eye. Actually, what they are seeing is the beginning of an effort to update an eighteen-year-old publication without changing its fundamental character, which is to present soundly-based articles related to the Arboretum and its work.

The physical changes were decided on with hopeful confidence they would please — the newly-designed masthead, the two-column format, the more modern layout, the drawings.

Within the covers, three new departments — Arboretum Notes, the Calendar and this page — have been added and the book section extended, additions aimed at serving the interests and convenience of readers.

The long-established Growing Notes of George Spalding, and the concluding half of Ross Goodrich's report on Arboretum viburnums, provide a gratifying sense of continuity. I am particularly pleased to begin my editorship with Ross Gast's account of his love affair with hibiscus, written in a style that nicely bridges the trail of scientific investigation with human experience.

I hope to make good use of this page by making it available to editors and writers in the field, and for airing the always welcome views and comment of readers.

Arboretum notes

Camptotheca acuminata

IN 1952 the Arboretum received a *Camptotheca* tree in a five-gallon can from Willard L. Hagen, Arcadia arboriculturist, who had obtained seeds three years earlier from the Lu-shan Botanical Garden in Kiangsi, China. The tree was planted in our Asian section and grew to a largely unnoticed specimen 35 feet tall. A second tree, propagated from the original, was planted on the western shore of Lasca Lagoon.

Medical science became interested in *Camptotheca acuminata* and began to look for mature specimens. Except for mainland China, such trees proved to be extremely rare. The trail led to the Arboretum. About six weeks ago, the oldest and tallest of its *Camptothecas* was cut down, trunk and branches cut into 18-inch lengths, roots dug up and placed in burlap sacks along with stems and leaves, and the lot shipped off to the U.S. Department of Agriculture station in Chico, from whence it was re-routed to headquarters in Beltsville, Maryland. There it was reduced for extraction of a drug called camptothecin, currently undergoing ever finer evaluations in National Institutes of Health and other laboratories for its highly promising use in the treatment of some forms of cancer.

There is more to this story than can be presently told, but it is illustrative of the role an arboretum can play in the vital life of our society.

Volunteers

LAS Voluntarias, that estimable group of women who lend their time and talents to serving the Arboretum in a variety of capacities, are expanding, a sure sign of a successful organization. They are forming Los Ayudantes, an auxiliary group of junior to senior men and women who will serve as helpers, or ayudantes, to the parent body. *Se invitan muy cordialmente todos los que tengan deseo de ser nuevos miembros.*

History

OUR historical section has been enriched by a number of period pieces from the days of famed Elias J. "Lucky" Baldwin. His grandson, Baldwin M. Baldwin, has given to the Arboretum through the California Arboretum Foundation some family portraits in oil and bronze, a photograph of EJ in his two-horse buggy, another of his Tallac house at Lake Tahoe, and one of his Rancho Santa Anita exhibit at the Mechanics' Fair of 1885 in San Francisco which appeared to consist principally of the products of his vineyards. Admirers of ornamental iron work will take particular pleasure in a pair of 10 by 7-foot gates from the Baldwin Hotel and Theater in San Francisco which, even before being restored, are quite impressive.

Part II

arboretum viburnums

The Deciduous Viburnums

Ross Goodrich

(EDITOR'S NOTE: This is the second half of a report on the viburnums in the Arboretum. The first half [LL, April 1967] covered the evergreen species.)

The Doublefile Viburnum

FOR spectacular spring bloom the *V. plicatum f. tomentosum* would be near the top of any viburnum list. Its double rows of blossoms on predominantly lateral branches make the plant rival the dogwoods, and would seem to be a good substitute for them in this area where the dogwoods are grown with some difficulty. The individual flower heads are made up of a center of small fertile blossoms, surrounded by a circle of large sterile ones, the whole measuring several inches across. Two rows of these on a branch make the lacy doublefile effect. The leaves are already on the plant when it blooms and while they stay on until fall, the foliage cover has always been a little on the sparse side. This is considered a small price to pay for such a spring show and could be due to location or soil variation; the plant supposedly likes a slightly acid heavy soil, where generally in this area the soil is heavy enough, though alkaline.

V. plicatum f. tomentosum

V. plicatum f. tomentosum

One of these plants is in the center of the Asian section and another is to the south, halfway to Tallac Knoll. Though reported to be better than *V. plicatum f. tomentosum,* the cultivar "Mariesii" in these plantings has not yet outdone it.

Viburnum sargentii cv. Flavum

SIMILAR in blossoming habit to the Doublefile Viburnum is *V. sargentii cv. Flavum,* an upright growing plant with large tri-lobed light green leaves. It is just a little less spectacular than *V. plicatum f. tomentosum* as to bloom, but it is still very showy and maintains its fresh green foliage through the summer. Then it becomes a little dull looking but at this time the plant produces brilliant scarlet berries in clusters that last until fall when they become bright red raisins as they dry up. One of these plants is in the extreme southeastern part of the

Asian section at the foot of Tallac Knoll and another is halfway between there and the center of the section.

V. sargentii cv. Flavum

Viburnum opulus cv. Roseum

THE European Snowball, *V. opulis cv. Roseum,* is quite common in Southern California, and though its performance in the Arboretum has not been spectacular, one plant in the center of the Asian section is good enough to warrant discussion. Many people assume that it will grow just anywhere, and like most viburnums it will, within reason. Here it has had the difficulty of being in very heavy adobe soil so the growth has been only moderate as opposed to rugged, but it has bloomed quite well. The blossoms are attractive from the lemon green early stage through the white, to the faintly pink stage as they get older. The blossoms are also attractive to aphis that attack this plant more than most other viburnums, and come in such numbers that it would take almost day and night care to keep them under control. In the autumn the leaves turn a tomato red, making a good show of color that lasts for about a month. This is a redeeming feature of this shrub in this area where we have no great display of fall colors, and it must be an additional reason for its being planted locally so much, since only the hardiest of gardeners would put up with the aphis on this plant when other snowball viburnums that do not have this fault are available.

Viburnum rufidulum

KNOWN as Southern or Rusty Black-Haw, this plant is native to the southeastern part of the United States where it can get to be a small tree of twenty feet. Here in the Arboretum it has been a shrub of some eight feet in height at the age of nearly ten years. It is an attractive plant of generally rounding shape with a balance between upright and lateral branches. It has dollar sized, finely serrated shiny leaves of medium green. During the spring and summer it often is unnoticed among the larger and more spectacular viburnums, but in the late fall it really stands out when it turns an even dark red; it regularly holds this color for a month. This plant is in a shaded location, so two plants were grown from it as layers and moved to more sunny spots nearby. Though their present small size makes judgment more difficult as to their overall reaction, their fall color has so far been equal to the parent. This plant produces cream colored flowers of only average interest but has attractive dogwood-like furry brown buds on it during the winter.

Viburnum dasyanthum

THIS is a rather large, quick-growing plant of some distinction. Its leaves are slightly crinkled, mostly ovate, and dark green, against which both the blossoms and berries show up very well. The blossoms are large heads of small white flowers that produce a generally soft effect. The berries are a brilliant red, small individually, but produced in fairly large clusters. These appear in late summer and for the most part hold on until the leaves of the plant begin to drop. This is

a very attractive sight; they look very much like holly berries and seem out of season this early in the year. The growth of the plant is upright, fairly rugged and even; this particular one is eight years old and about ten feet tall.

V. opulus cv. Roseum

Cultural Problems

WHAT follows is not intended as a guide to the growing of viburnums; rather it is an attempt to recall some of the problems met with in the growing of these plants. The soil types a viburnum will grow in are varied; in the Arboretum this would be a necessity for survival. For instance, one five-foot soil plug in the Asian section produced seventeen distinct colors, types, or formations of soil. A loamy soil is the ideal for most plants, including viburnums; in the Arboretum great areas are of such dense clay that continued applications of humus merely disappear in the muck. Many of the viburnums have tolerated even this, and while a few prefer an acidity approaching that suitable for azaleas, most like a pH of from 6 to 6.5. In some tests here the highest reading was 8.8, and it is a continuing battle to get it down to as low as 7.5. All of the soil is not this bad, of course, but due to limitations of space some of the plants have to be tried in these poorer spots.

The watering of large areas is always difficult. In the mixed plantings necessary in an arboretum, what does one favor? Water the lawn or meadow enough to keep it green and thereby encourage the fibrous surface roots of the viburnums that may dry up and injure the plant in a prolonged hot spell? Or let the grass go dry in the hope the viburnums will develop roots that get down into some of the deeper layers of soil? It is a struggle to keep a balance. The leaves of the deciduous viburnums especially burn early in the summer, and their growth for the season is often checked at this time. Trying to keep them in a little more humid atmosphere by sprinkling can only be done so-so and not at all successfully. A period of warm weather, when one feels he has the situation under control, will be immediately followed by an extremely hot spell when the humidity drops to almost zero. In this situation it is like an attempt to put out a fire; most of the damage is quickly done.

New plantings are always a problem. From the comparative coziness of the nursery to the harshness of the field is a great change for them. Here it is nice to have several plants of each species to better insure survival and, also, for purposes of comparison when they do grow. It is difficult to water newly set out plants throughout the summer in their exact needs without at times overwatering some of their older neighbors. And sometimes watering is put off a day or two on the basis of a prediction of heavy rains. If the rain doesn't show up damage is done.

The insect trouble has been minor. A few aphis seem to be on one or another species almost throughout the year. Only the heaviest infestations can be given proper attention and the worst apparent damage is the smut that follows on the *V. suspensum* when the early spring attacks occur. Scale and mealybug have shown up at times, but are easily stopped and reinfestations are not apt to show up if the ants are brought under control. The crib-rate weevil, a fairly new arrival in this

area, has had a jolly time making scalloped edges on a good many of the plants, but it is hoped that it can be conquered. Mildew has also been a very minor problem, showing up mainly on the *V. tinus* and then usually on its weaker forms such as the variegated ones.

Feeding viburnums has been simple for most of the areas. They are fed lightly at planting as with other plants, and thereafter as judgment dictates. They are reported to need only moderate amounts of nitrogen as compared to so many of our other plants that are nitrogen hogs, and it is easy to overdo it with the viburnums just from force of habit. If this happens, the results show soon in either a setting of the growth temporarily or an extreme darkening of the foliage, but from the times this has happened no apparent permanent damage has been done.

Several viburnums in the deciduous group have failed to establish. A few have stayed alive but not flourished, and sadly these happened to be among those especially noted for their attractiveness. The first that failed was *V. fragrans,* and then *V. carlesii;* they simply refused to take hold and grow. A good many in the deciduous group come on each spring with very healthy foliage but in the first few hot days the leaves begin to crisp and they spend the rest of the summer in a semi-desiccated condition. *V. X. bodnantense* is one of these but twice it has put out sprigs of blossoms. These are fragrant and beautiful enough to encourage working more with this plant.

Notes on viburnums not discussed in detail

NONE of the following is meant to condemn any species that has not done well. In addition to nature itself, there is always the chance of human failure in just not being able to provide what the plant needed at a particular moment of its growth. It is hoped that many of these can be tried again as availability, time and growing space permit.

V. betulifolium — beautiful, slightly crinkly leaves; a promising looking plant.

V. bracteatum — quite dry looking foliage but interesting blossoms.

V. burejaeticum — neat but just so-so appearance; rather unpleasant odor to blossoms.

V. burkwoodii — good plant, fragrant blossoms, sometimes gives a little show of fall color.

V. chenaultii — attractive, semi-evergreen.

V. cotinifolium — attractive rounding leaves but dry looking; holds foliage until late in the year.

V. dentatum pubescens — reasonably good appearance, fair blossoms; good fall color some years.

V. lantana — fair appearance, mostly dry looking foliage.

V. lantana lanceolatus — greener and better looking than the above; good fall color.

V. lantana macrophyllum — uneven growth and almost bare of leaves a good part of the time.

V. lantana rugosum — almost like *V. cotinifolium* but just so-so.

V. lobophyllum — fair appearance. Good color but sparse foliage.

V. mongolicum — spindly growth, only fair appearance.

V. prunifolium — ordinary as to bloom and summer foliage; good but short-lived fall color.

V. pubescens indianense — few blossoms but good fall color.

V. rhytidophylloides — fairly good, but plain looking; stays green a long time.

V. sieboldii — beautiful long green leaves when they have been green — it has been a real battle with chlorosis on this one.

V. trilobum — the American Cranberry Bush. Interesting and attractive, but outshone by *V. Sargentii.*

V. veitchii — moderately good appearance.

Part I

memoirs of a hibiscus hybridizer

ROSS GAST

MY affair with hibiscus began in Honolulu over thirty years ago. I came to Hawaii with a New Deal hangover — as a dedicated liberal, I had had the unfortunate experience of being given an opportunity under the Roosevelt administration to implement some long-espoused theories of social reform, only to find that as long as people act like human beings these theories would remain only theories. Badly shaken up over such a deflated awakening to reality, I was determined never again to become deeply involved in any way, but would live out a life well lost to futility. I would, in fact, become a drop-out, but as in those days to drop out meant to drop eating, I accepted a post with the Agricultural Extension Service of the University of Hawaii.

My enchantment with the queen of tropical flowers really began in a very prosaic way. True, the sensuous caress of the trade winds had already begun to soften an assumed veneer of indifference, yet it seems rather incongruous now that I should have been drawn into such an enduring alliance by a dour Scotch gardener and his penchant for tying little white tags on hibiscus bushes on the university campus.

Our matchmaker was the late A. B. Bush, for many years head gardener at the University of Hawaii. He was a compulsive hibiscus pollen duster and originated many of the fine Hawaiian hybrids popular thirty years ago. The white tags were his cross markers, and when I expressed an interest in his activities, he took me to his home and showed me his collection of seedlings which had resulted from his campus crosses. I began to follow him around to learn his techniques and do a little pollenization on my own. When I saw the pods form from my first crosses, I was incurably "hooked."

Hawaii was, and still is, the acknowledged fountainhead of most experience and knowledge on the subject of hibiscus hybridization, especially for show type

hybrids. It all began nearly 100 years ago when a small group of amateur gardeners, most of them members of the old, wealthy plantation families, took up the activity as a hobby. They brought in hibiscus from all parts of the world and crossed them to develop new colors and forms. But around the turn of the century, one of them, reportedly W. M. Giffard, began to use the native Hawaiian whites and reds in his crosses. This infusion of strong native "blood" (some forms of Hawaiian white are tree-like in size) really stabilized their crosses, and established the basis for the modern Hawaiian hybrids.

By the time I arrived in the Islands, the hobby was on the wane (it became popular again a few years later) but I pestered those who were still dusting pollen. Particularly did I pick the brains of the old Japanese gardeners who produced most of the hibiscus planting stock at that time. Many of them had been "yard boys" for the wealthy amateurs and were themselves the repository of many secrets of the hybridizing hobby. From them I learned much about the techniques of pollenization, how to recognize the proper condition of the pollen and the flower parts to effect successful crosses, etc. From them I also learned the great pride of parentage which comes when one begins to produce his own hybrids. I saw, too, a tendency which I have since observed many times — that hobbyists often take in considerable territory in this direction. Like the old nurseryman of Kalihi-kai:

Whenever I questioned Ito-san as to the origin of a hibiscus variety, he always claimed it as his own. Finally I became suspicious and, walking over to a large bush of Common Red known in the nursery trade for a hundred years, I feigned surprise over the size and uniformity of the flowers and the magnificence of its foliage, and asked him who originated it. "Oh, I make him myself," he proudly replied. "Two, t'ree year 'go, I make him."

Returning to the mainland after my tour of duty at the University of Hawaii, I brought my new interest with me. But for a few years my efforts were limited for two reasons: first, money, and second, the fact that while there are more hibiscus grown as dooryard plants in Southern California than any other tropical or subtropical area of the world — Hawaii *not* excepted — they will not seed freely here. I needed a greenhouse, but the children also needed shoes.

I did begin to build up a bibliography on hibiscus, however, reference material which now forms the nucleus of a much larger collection in the Los Angeles State & County Arboretum Library. This has proved extremely valuable in carrying on the present hibiscus hybridization program at the Arboretum, the basis of which is the collection of old varieties and true species which I began to collect at that time, and later presented to the Arboretum Foundation. This project is not confined to genetic research but is in fact a commercially-oriented selection project to produce hardier hibiscus for Southern California, "tailored" cultivars to be introduced by cooperating nurserymen.

In contrast to the development of so many of our garden favorites, the transformation of ornamental hibiscus from obscure species to its present high state of cultivation is due to the dedication of amateur plantsmen, rather than to formal genetic research by plant scientists.

LIFE in Hawaii has a way of sorting out one's concept of relative values, so by the time I was ready to return to the mainland I was also ready to allow myself to be seduced by the capitalistic system. A few years later, both shoes and greenhouses were no financial strain, and at last my project was really under way. My first greenhouse (1946) was designed to maintain temperatures (68°-85°) and humidity recorded in Honolulu, and from the very first cross I was able to get seed and eventually bloom my first seedlings, a thrill which if I attempted to convey in words here would require the remaining pages of this issue of LASCA LEAVES. Every one was gorgeous in color and perfect in form, and without a doubt ready to take its place at the head of the local nursery list! Today, some 50,000 seedlings later, they would be discarded with the appearance of the first bloom.

But there were problems. First, hibiscus seeds are finicky germinators. I found that seeds from any one pod would vary in germination time from three weeks to three months. This proved to be a real difficulty as I was not able to follow through personally because of the pressure of business. Thus I lost a lot of seed the first years. But I eventually learned to "nick" each seed, cutting off a small segment of the epidermis with a very sharp knife or razor blade. If this is done, all seed will germinate quickly and almost all at the same time. A seeding and potting-on system was eventually worked out under glass which is almost fool-proof, and production problems were thus solved. We are now able to bloom seedlings in from nine to sixteen months. It used to take two or three years.

The speed-up in blooming cycle was also due to the implementation of an observation made early in my work with hibiscus. This is the fact that the very first bloom from young seedlings will seed in almost all crosses, and serve as a pollen plant as well. All existing literature on the subject of hibiscus hybridization advises the use of only mature plants in any hybridization program.

I also found it difficult and expensive to hold greenhouse temperatures below 85 degrees during the late summer and early fall months, the natural blooming season

A part of the three to six thousand seedlings grown and evaluated each year in connection with the hibiscus research project at the Arboretum. In greenhouse, plants are brought to bloom in nine to fifteen months as opposed to two to three years outside.

DR. STEWART

was named in honor of the director of the Arboretum. A low-growing plant with excellent foliage and radiant orange-red flower, it is an early and prolific bloomer. For the hybridizer it has the special quality of being an outstanding parent; it is one of very few varieties that always upgrades a cross.

LASCA BEAUTY

is extremely strong, the result of several generations of selection toward this objective. It is particularly recommended for garden locations where a tall, strong grower is wanted. It produces the largest blossoms of any hibiscus yet grown in California, some reaching a diameter of 9½ inches.

for hibiscus. I solved this problem by cutting back my plants in early summer, forcing them into bloom during the winter months when I could hold temperatures to the required level. This practice more than doubled my seed crop. About this time, too, I learned to stabilize seed set by applying a smear of 3% indole-butyric acid in lanolin to the point of abscission at the time the flower is pollinated. This cuts the incidence of pod drop as the butyric acid strengthens the point of abscission.

But the greatest problem, I soon learned, was that only a few of the common varieties of hibiscus available here at the time would serve as parent plants under any circumstances, even under greenhouse culture. It would, therefore, be necessary for me to bring in still more varieties, and even species, if any real improvement in hardiness and other cultural requirements for Southern California conditions were to be effected.

It may be well to explain here that while accorded species status by Linnaeus and named *Hibiscus rosa-sinensis* by him, the ornamental hibiscus as we grow it today is not a true species but a highly polymorphic group composed of complex hybrids and their derivatives.

For this reason, seed produced from any cross between two varieties will produce a wide range of color and form in flower, and plants which differ both in growth habit and vigor. This heightens the interest in hibiscus hybridization as a garden hobby, and offers an interesting field of research to the geneticist. Particularly does it suggest the importance of determining just what species were the progenitors of the many older forms of *H. rosa-sinensis* which are to be found in many parts of the world, and a genetic study of these forms to determine if they are themselves true species.

To me this represented a challenge, and thus a careful study of all available literature and herberia records seemed to be the first step.

I found that the known species genetically compatible with all forms of *H. rosa-sinensis* and with one another are *H. schizopetalus,* an African East Coast species; *H. liliiflorus* from Mauritius and Rodriguez Island; *H. fragilis* and *H. boryanus* from Reunion Island; *H. arnottianus* and *H. kokio* (several forms of both) from Hawaii; *H. storckii* from Fiji, and *H. denisonii,* origin unknown. Most authorities agree that from these species — and perhaps some additional undetermined species — all forms of *H. rosa-sinensis* have evolved. It is quite possible, too, that among the many forms of hibiscus currently considered under *H. rosa-sinensis* there may be some that are, in fact, true species separable from this complex.

This being the case, it seemed to me that comprehensive programs for the development of hardier cultivars for Southern California should have all of these species available, and as many of the older forms of *H. rosa-sinensis* as could be found. And how interesting it would be to search for these myself!

Fortunately, my occupation eventually became what might be called an international pedlar, although my route was pretty much confined to the States, Hawaii, and Europe. But I was able to see all of the botanic garden collections in these areas, and to draw on many private collections, particularly in Hawaii, and Florida. In Europe, I added to my bibliography and studied herbarium materials at Kew, Edinburgh and other great institutions so as to familiarize myself with species no longer found in collections.

The first of my true breeding stock came from Hawaii, collected on a visit there in 1946. Most of it was secured from the late J. A. Johnson who, in my book, was the most perceptive and skillful hybridizer of his time. He originated many of the hybrids which were the parents and grandparents of the fine Hawaiian hybrids of today. What is more, he was one of the few men working with this

exotic flower who was willing to share his experience with others.

For instance, because of the sorry absence of any sustained authoritative genetic research, there was — and still is — little known about what can be expected from a cross of any two hybrids. Only through experience does one learn to know the dominant characters of each member of his "stud farm" and can thus give direction to his work.

J. A. Johnson made my start in hybridization much easier by not only giving me stock of each of his favorite parent plants, but also notes on what characters I might expect from at least a few plants from each cross. Unfortunately, I did not have the background to take full advantage of this generous assistance, although "Ross Estey," my first commercial introduction (through Monrovia Nursery) had as its parents two of Johnson's hybrids, one an F_1 hybrid from native Hawaiian white.

DURING the early 1950's most of my acceptable hybrids were sent to friends in Florida, where a number of amateurs were beginning to ride the hibiscus hobby and where nurseries were not only interested in new hybrids but were pushing the sales of older forms as well. Eventually, some of my seedlings appeared in the trade there. At the time, most California nurseries were satisfied to grow and offer only a few of the old forms which had been in the trade a hundred years; in fact, this is unfortunately the case with most of them now.

It did not take long for the hibiscus hobby to become extremely popular in the central and southern parts of Florida which have the truly subtropical climate in which this ornamental shrub grows at its best.

As a result of this interest, the American Hibiscus Society was formed in 1951 at Palm Beach, and has since become world wide in membership. I am proud of the fact I was present as one of the founding fathers, and also that today I am one of the two honorary life members.

Most of the chapters of the Society in Florida hold hibiscus shows each year, and the competition is very keen. Thousands of blooms are displayed, with major interest centered on the new seedling awards. Each year, many new show varieties are thus added to the nomenclature list of the Society.

We have often been asked why there is not more interest in the newer hibiscus hybrids in Southern California. The answer is one which cannot be told in a few words, as not only cultural, but also economic problems are involved. But basically, most of the new hybrids produced for Hawaiian and Floridian conditions will not bloom well here, largely due to cooler night temperatures and prolonged cold soil temperatures during the winter months. But our hibiscus suffer less frost damage than is known in Florida, where heavy frost loss is not uncommon. In most cases, however, plants in Florida "come back" in a few weeks.

Here we need not lose older hibiscus plants from frost (in most areas of the Los Angeles Basin) if proper care is taken to see that they are well drained in winter. The heaviest losses are in the winter following planting of new plants, and this can be minimized by selecting well rooted stock and planting it no later than September. Losses also occur when plants are pruned heavily in early winter; the proper pruning time is late February or early March, and most varieties should never be cut back entirely at any one time.

It was not until 1958, when I partially retired from business, that I was able to complete the collection of old forms and the species which I eventually brought to the Los Angeles State & County Arboretum at Arcadia. At this time Joseph Staniford, another hibiscus enthusiast, had joined me as a collaborator.

While I had brought in propagating stock of many old varieties from Hawaii and from botanic gardens in England and

the continent, as well as seed from Asia, the first real collection trip was made to the Canary Islands and Madeira in 1961. These islands, the former a Spanish possession and the latter belonging to Portugal, are of special interest to plantsmen because it was there that the early Spanish and Portuguese explorers brought plants from India and other parts of Asia for acclimatization for later introduction to Spanish and Portuguese gardens. Also, these islands were an important port of call on the long route around the Cape of Good Hope to Europe, and thus many Asian plants were established there by this commercial contact.

Of special interest to me, however, was the famous Orotava Gardens on the island of Teneriffe in the Canaries. This garden was established by the Spanish in 1797 as an acclimatization station, and today many of the original plants still survive. A number of very old forms of hibiscus, brought from China, India and the Mascarene Islands, are there; one a double magenta, had grown to 20 feet high with a "trunk" 12 inches in diameter. A few days ago, in checking over our latest crop of seedlings, a large, handsome, shocking-pink double on a strong plant stood out from the entire lot. In consulting our pedigree cards I found that its granddaddy was the magenta immigrant that I had sent back, with many other old varieties, from Orotava. It will be offered for distribution next year.

Shipment of scion wood is no longer a problem. Small sticks for grafting are placed in a polyethylene bag with a bit of wetted sphagnum moss from which 90 per cent of the water is squeezed out. In my case, the National Arboretum in Washington has been kind enough to supply me with official U.S.D.A. plant permits which I affix to all shipments. The material is then delivered to the National Arboretum, where it is propagated while still under quarantine, and the resultant plants sent to us.

Of the cross compatible species mentioned, *H. arnottianus, H. kokio* and *H. schizopetalus* were brought into our collection early from Hawaii. And in 1963, *H. denisonii* was found in Kew Gardens, London. Of the species' then, there remained to be found only *H. storckii* from Fiji, and the Mascarene species, *H. liliiflorus,* from Mauritius, and *H. fragilis* and *H. boryanus* from Reunion Island.

H. storckii was the objective of my first hunt for true species, and two trips were made to Fiji, in 1963 and again in 1965. Fiji was also of interest because it was from this group that the early Hawaiian hobbyists received most of the old varieties which they used in their hybridization. Undoubtedly, these had been brought in to Fiji by the Indian workers who themselves had come to Fiji as sugar cane labor.

H. storckii was found by Dr. Berthold Seemann on the Fijian Island of Tavenuni, and described by him in his "Flora Vitiensis" published in 1865. He named it for his assistant, Jacob Storck, and sent materials to Kew Herbarium, with which he was connected. Before visiting Fiji the first time, I contacted several authorities there and was informed that the species had been lost to cultivation. This seemed strange, as several amateur hybridizers and collectors were active in Fiji over the years. It was described as a low-growing underwood with a "small light pink flower, a small dark eye zone." As I had studied the original specimen at Kew, I also had a detailed taxonomic description.

On both trips to Fiji I found several hibiscus which met this flower description fairly close, as well as all of the morphological characters of the original specimen of *H. storckii.* However, we

have since selfed all the material collected in Fiji, and in every case it appeared to be of hybrid origin but without any genetic evidence of either Mascarene or Hawaiian "blood." We also found *H. denisonii* in Fiji, and it, too, meets Seemann's description of *H. storckii* in many particulars. However, it is a true species, tests show. There is the possibility, then, that further study may prove that *H. denisonii* is a Fijian species, and closely allied to *H. storckii.*

So far neither *H. denisonii* or the Fijian pinks have proved to be of any immediate value in the development of more attractive flowers. They are very dominant in this respect, and most F_1 seedlings from crosses in which they are used as either parent produce flowers resembling the Fijian plants or *H. denisonii* in flower size and color. However, when crossed with some older varieties of *H. rosa-sinensis,* extremely desirable plant vigor is obtained.

HIBISCUS is very much at home in Fiji, and is very popular there; nearly every home, office and hotel lobby has a fresh display of blossoms each morning. Most of the varieties are older ones, apparently of Indian origin, but several hobbyists have fine collections of modern hybrids. Through mutual friends in New Zealand, we were contacted by one of them and asked to luncheon at their beautiful home high in the hills above Suva. As we entered the living room, my eye caught a flash of color on a low center table and it turned out to be a lovely arrangement built around my "Ross Estey." They had brought back a plant from California several years before, and it was very much at home in its new environment. I have since seen many of my originations in gardens in various parts of the world, but never again have I experienced the thrill of finding the flower named for my grandson, Ross Walton, in such a lovely setting.

In spite of the interest in hibiscus in Fiji, there is no mention of this flower in the printed history of the Fijian people. In an effort to learn if hibiscus had any ethnic significance as far as the Fijian people are concerned, I asked a huge native with whom I had become acquainted if the flower was known and used before the Europeans were well established in Fiji.

"Oh, to be sure," he replied in his soft-spoken but perfect Australian-English. "Our people always served up white missionaries with a hibiscus over each well-charred ear." I did not pursue the matter further.

Our first visit to Fiji was the initial stop on an Island-hopping adventure which took us to Tonga, Nieue, and Samoa. I found many older varieties on these islands, but most of them were already in our collection. However, I did see the old double red at its best. This hibiscus was the one described by Linnaeus and for many years was the only form of *H. rosa-sinensis* known to Europeans. Botanists say it was brought into the Pacific during the early Polynesian migrations from Southeast Asia in pre-European discovery days.

A recent letter from a nurseryman friend in New Zealand reminded me of an experience during this voyage, made on the inter-island steamer "Tofua," which we boarded at Suva. Our table companion was Prince Tungi, then Prime Minister, and now King of Tonga. Although a lawyer by training, he is very much interested in horticulture and as I was introduced to him as a specialist on hibiscus, he asked about the availability of some of the newer hybrids he

had seen in Hawaii. I referred him to my nurseryman friend in Aukland, as New Zealand has very close ties with Tonga.

In this recently received letter, my friend told me that he had been commissioned by the Tongan government to develop a hibiscus show garden in Nukalofa, the Tongan capital, as a tourist attraction, and asked me to send scion wood of all of our newer hybrids. I'd like to think that the idea of this garden grew out of my conversations with Prince Tungi; I was certainly vocal on my favorite subject!

New Zealand and Australia contributed several old varieties not found elsewhere. There is a great deal of interest in hibiscus on the North Island, particularly in Aukland, where ornamental hibiscus do quite well in most locations. The nurseryman mentioned above had brought back many of my hybrids on a trip to California a few years before, and I found them acclimated there, along with some modern Hawaiian hybrids. Large shipments of scion wood have since been made to New Zealand nurserymen, and our varieties are now in the trade there.

Australia, too, has become hibiscus minded in recent years, with several hybridizers bringing out new seedlings each season. This activity is mostly confined to the northern coast of New South Wales and in Queensland, although hibiscus is a popular dooryard plant in most parts of Australia.

It was in Australia that I first saw the so-called "Peradynia Hybrids," originated at the Peradynia Botanic Garden in Ceylon. Work on hibiscus began there about the same time as the Hawaiian hobbyists were making their start, and there was an interchange of plant material. As a result, some of the Peradynia hybrids, I found, were either of Hawaiian origin, or were F_1 hybrids with native Hawaiian ancestry. Most of them, however, were developed from older forms of hibiscus, known and grown in Asia for centuries.

I was able to secure a large number of these hybrids in Australia, which was fortunate, for when I arrived in Colombo, Ceylon, bent on visiting Peradynia, civil unrest made it impossible for me to travel into the interior at the time.

Another source of old varieties was the Singapore Botanic Garden, where some work on hibiscus had been done in the 1920's. It was there that I first learned to appreciate the contribution of the Mascarene species, especially *H. liliiflorus,* when crossed with *H. schizopetalus.* This cross reportedly resulted in the small flowered varieties popularly called "Butterfly Hibiscus," now used as a hedge plant in many parts of the world. There is much work yet to be done on this particular cross, however, as it is not yet fully understood.

We noted that some of the hybrids at the Singapore Botanic Garden had deeply cut, three-lobed leaves. For some years, many of our seedlings had developed this character, particularly in their early stages of growth. This was explained by geneticists as evidence that somewhere in their genetic history a heterophyllus species had been used as a parent. No species with which we were then familiar had this characteristic, so we guessed that it might have come from the Mascarene species, probably involved in some of the old varieties we were using. We had never been able to find any of the Mascarene species in botanic gardens or private collections throughout the world; *H. liliiflorus* had been in such collections up to about 40 years ago, but was no longer available. Obviously, then, a visit to the Mascarenes was in order!

(This is the first part of a two-part article.)

George H. Spalding

Growing notes

TO the true plantsman few experiences can match the thrill of seeing the first seedlings of a new and unknown plant obtained from some distant part of the world. It requires patience to grow a plant to maturity and give it adequate testing. There is always the temptation to introduce a promising species quickly while initial enthusiasm is high, without waiting for it to reach maturity, or go through a cold winter, or undergo any one of the many other tests required before a plant can be considered ready for introduction.

When a plant has been fully tested and is ready for introduction, propagating stock plants are grown and made available to nurseries at cost of production. Although brief resumes are sent to trade journals when a new plant is released, to date no full account of Arboretum introductions has been published. So from time to time detailed reports of Arboretum plant introductions will appear in Growing Notes to provide a continuing official record.

One of the most interesting LASCA plant introductions is the so-called white jacaranda. This selection is considered a pure white form of *acutifolia;* however, such an albino variation has not been recorded in the Peruvian floristic literature. This accession, received in 1952, resulted from the efforts of Dr. Russell J. Seibert, then director of the Arboretum. While working in Peru in 1946 he had seen trees of this white form growing at the Agricultural Experiment Station of La Molina in Lima. It was reported at that time to have been introduced into cultivation from wild material found near Huanuco, Peru.

Feeling that this tree had great horticultural potential for Southern California, a successful attempt to obtain budwood was made resulting in the 1952 accession. Eleven dormant sticks were received. It has been reported that this jacaranda had been propagated by cuttings in Peru. The budwood sticks received were of thick caliper and failed to root when treated as cuttings. As soon as it became evident that the cutting method was not going to work, buds were taken and worked onto available rootstock of the typical *Jacaranda acutifolia.* Two of the budded seedlings "took," but only one survived. This survivor provided buds for additional propagations two years later.

The original tree at the Arboretum first bloomed in 1957. Its flowers appeared in rather small trusses in this first season, but the color was a good clear white. Flowerings in later years have produced larger trusses, but while occasionally promising, the over-all performance is disappointing. Consequently, bloom has been erratic and not particularly effective. We do not know the reason for this poor performance, but believe it to be physiological in nature, or possibly poor adaptation to this particular region. If the cause can be found and removed, the white jacaranda will become a major addition to our list of outstanding flowering trees.

This jacaranda was offered to the trade through a notice in the Pacific Coast Nurseryman of April, 1961 (Vol. 20, No. 4, pp. 20-21).

Thanks are due Austin Griffiths, Herbarium Curator at the Arboretum, for the suggestion that this series be undertaken.

BOOKSHELF

The Last Redwoods: Photographs and story of a vanishing scenic resource. By Philip Hyde and Francois Leydet. 127 p. 85 photographs (8 in color). 2 maps. Bibliography. Sierra Club, San Francisco. 1963.

This beautiful book with a foreword by Secretary of the Interior, Stewart L. Udall, is number six in the Sierra Club's Exhibit Format Series. It is at once a testimonial to the past and present, and a petition to the future. It traces the history of California's unique "immortal," *Sequoia sempervirens,* whose significance transcends the state and nation.

The forty-five-year fight of the Save-the-Redwoods League on the state level, and the tardy federal support — starting to mature only since the book's publication — are outlined. The great need for public realization and championship of this number-one conservation project cries from the pages.

The superb photography of Philip Hyde, supplemented by Ansel Adams' contrast studies and many other fine photographs, opens the heart of the redwood realm to the reader. The 14x10½-inch page size is well adapted to the grandeur of the subject matter. Black and white studies come further to life in the color section. Word descriptions are as beautiful as the photographs.

Feelings are not spared; many of the photographs are "afters," not "befores." Two maps show the past and present range of *Sequoia sempervirens* and the location of redwood parks.

The Last of the Redwoods is a practical book. Conflicting interests are well understood; the importance of considering whole watershed areas and of employing the long view is stressed. As John Muir so poignantly wrote: "Any fool can destroy trees . . . only Uncle Sam can save them from fools."

This book was presented to the library of the Los Angeles State and County Arboretum by the Hancock Park Garden Club of Los Angeles.

Trees and Shrubs of Mills College, by Baki Kasapligil. 56 p. Illustrated. Bibliography. Mills College, Oakland. 1967.

This handy booklet summarizes in tabular form some 450 species of woody plants growing on the Mills College campus in Oakland, California. Dating from 1871, the collection of natives and exotics has been built by Dr. Cyrus Mills, Dr. Aurelia Henry Reinhardt, Dr. Howard E. McMinn, and the author. It incorporates the beautifully maintained Joseph McInnes Memorial Botanic Garden.

Plant information includes scientific name, common name and native habitat. Brief descriptions, aided by a glossary, aptly include flowering season. The scattered illustrations are excellent; a detailed removable map shows location of species. It would have been helpful if the family name had been included with each scientific name.

Lydia Bowen

Briefly

Wine in California, by Mary Francis Kennedy. Color and black-and-white photographs by Max Yavno and foreword by Maynard Amerine. 125 p. Univ. of California Press, 1962.

Next to man, bees are probably the greatest consumers and best judges of wine, with the distinction that bees make their selection and do their drinking on the vine rather than from the bottle. This and other interesting facts are told in this popular history of wine in California punctuated with appreciative quotes from writers of the past. A handsome book with first-rate photos.

Time and the Terraced Land, by Augusta Fink. Howell-North Books, 1966. Photographs and bibliography.

An engaging history of the Rancho de los Palos Verdes and its principal characters: the contending family of Juan José Domínguez and José Dolores Sepúlveda; the Gabrielino Indians, who were innocent bystanders; and the port of San Pedro.

(The foregoing books are in the LASCA Library.)

General

How to Control Plant Diseases in Home and Garden, 2nd Ed., by Malcom C. Shurtleff. Iowa State University Press, 1966. 649 p. $8.50.

A new edition of a basic reference. Deals with diseases of indoor plants, turfgrasses, woody plants, annuals and vegetables.

The Poppy and other Deadly Plants, by Esther Baskin. Drawings by Leonard Baskin. Delacorte Press, N.Y. 74 p. 1967. $12.50.

A book for those who like scientific information presented in a literary context of historical references, plant legends and lore. Beautiful illustrations accompany the history of some of the more deadly poisonous plants, including the hemlock, hellebore, mandrake and nightshade.

CALENDAR 1968

flower shows

Arboretum **Arcadia**

May 30, 31, June 1, 2
Bonsai Exhibit
June 21, 22, 23
Gladiolus Show
July 4, 5, 6, 7
Cactus and Succulent Show
July 13, 14
Begonia Show (San Gabriel Valley Branch)

South Coast Botanic Garden Palos Verdes

June 7, 8, 9
Fiesta de Flores Golden Days
Friday 1-7 p.m.
Saturday 10 a.m.-7 p.m.
Sunday 10 a.m.-6 p.m.
Admission Free

GENERAL

June 8 **Huntington Beach**
Annual Flower Show, sponsored by Golden West Branch of California Division of Women's National Farm and Garden Association
Christ Presbyterian Church
20112 Magnolia
10 a.m.-7 p.m.
Admission Free

June 8, 9 **Anaheim**
American Rose Society National Show
Disneyland Hotel
Saturday 2-9 p.m.
Sunday 10 a.m.-5 p.m.
Admission $.50

June 9 **Santa Barbara**
Special sectional meeting of the Cactus and Succulent Society of America
Museum of Natural History
2559 Puesta Del Sol Road
1 p.m. Museum open for tours in the morning
Admission Free

June 14, 15, 16 **Costa Mesa**
14th Annual Fuchsia aand Shade Plant Show
Orange County Fairgrounds
Friday 3-9 p.m.
Saturday 10 a.m.-9 p.m.
Sunday 10 a.m.-6 p.m
Admission Adults $1, Students 12-16 $.50, Children under 12, free

June 22, 23 **Lompoc**
47th Annual Flower Festival
Flower show presented by Alpha Literary and Improvement Club
Veterans Memorial Building
Saturday 1-9 p.m.
Sunday 10 a.m.-6 p.m.
Admission: Adults $1, Students $.50, Children under 12, free
Other events free
Parade 10 a.m. Saturday
Visits to commercial flower fields, entertainment and exhibits at Ryon Park

June 26, 27, 28, 29 **Ojai**
17th Annual Convention of California Landscape Contractors' Association
Ojai Valley Inn and Country Club
Free exhibits open to the public
Daily 8:30 a.m.-4 p.m.

June 26 - July 7 **Del Mar**
Southern California Exposition at the San Diego County Fairgrounds
Flower show, garden and landscape displays
Daily 10 a.m.-10 p.m.
Admission: Adults $1.50, Children 6-12 $.50, Children under 6 free

June 29, 30 **Culver City**
15th Annual Flower Show of the Culver City Garden Club
Veterans Memorial Auditorium
4114 Overland Avenue
Saturday 2-10 p.m.
Sunday 10 a.m.-6 p.m.
Admission Free

July 12-20 **Santa Barbara**
49th Annual National Horse and Flower Show
Earl Warren Showgrounds

July 30 - August 25 **Los Angeles**
Southern California Chapter American Society of Landscape Architects Exhibit
California Museum of Science and Industry
Exposition Park
Daily 10 a.m.-5 p.m.

August 3, 4 **San Diego**
Dahlia Show
Conference Building, Balboa Park
Saturday 2-8 p.m.
Sunday 10 a.m.-6 p.m.

August 22, 23, 24, 25 **San Francisco**
San Francisco Flower Show
Golden Gate Park
Hall of Flowers

August 24, 25 **Hawthorne**
Annual Begonia and Tropical Plant Show
Hawthorne Memorial Building
Prairie and El Segundo Blvd.
Saturday 1 p.m.-10 p.m.
Sunday 10 a.m.-6 p.m.
Donation $.50

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Lydia Bowen

Lydia Bowen died on April 1st, at sixty, after a short illness. Her book reviews for this issue had already been written, an index of the thoroughness characteristic of her four years' stewardship of the Arboretum library. Her daily preoccupation was the written world of plants and birds, a world she moved in with quiet enthusiasm and with an eye keen to the needs of library users: the students, staff members, and public who were sometimes surprised yet invariably heartened to find this shy woman with the friendly smile so ready to assume the burden of their inquiry.

Those who worked with Lydia learned of her interests and activities only from the most casual of remarks, dropped incidently but relevantly in the course of a bibliographic discussion, or perhaps while examining and admiring some plant specimen, or maybe while pausing to follow the flight of a migratory bird. In this offhand way we learned of her considerable academic credentials in the biological sciences, in paleontology, and in library science; of her passion for exploring the flora of California; and of her affiliations with the National Audubon Society and the Audubon Society of Pasadena, the city in which she was born and lived most of her life. The International Harvester camper which she drove to work in was more than an identifying vehicle; it reflected the straightforward, adventurous spirit of its owner, and spoke of exploratory trips to remote, favored areas like Baja, California, where she rejoiced in roughing it with her brother and her nephews.

If this all added up to a person deeply involved in nature and wildlife, it also suggested an idealistic, romantic temperament with a range of expression wider than visible. Death, as it has a way of doing, revealed an expressive side of Lydia known only to a few.

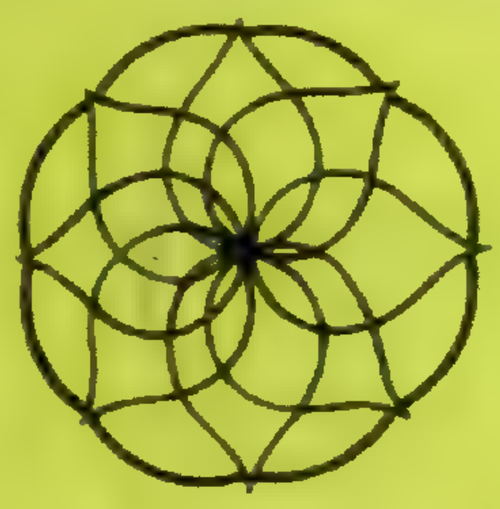
She played the piano, sang in choral groups, and had a lively interest in Spanish folk music. Perhaps most revealing of all is a collection of poems — short poems of one, two and three stanzas that express her feelings about the beauty and mystery of nature. In the last stanza of Apricot Mallow, she shows us her sensitivity to the alternate brightness and gloom of weather:

> I'd like to see a sunset storm
> Swirl rainbows down the gloom;
> And scatter their most witching gold
> In petal flakes on desert's gray
> To make the mallow bloom.

In these lines from Oriole she again relates the world of nature to man's:

> . . . Soft chuttering,
> They rendezvous to banquet daintily
> Among abutilon's sun-honeyed bells.
> Is this a glimpse of what a world
> might be
> released from grim survival's
> strife, so all
> might live in symbiotic harmony?

We think that readers of this quarterly would enjoy reading other of Lydia's poems, and so from time to time we will publish them, confident that though she never offered them here before she would not now be unwilling.



Lasca Leaves

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The Cover

Arboretum scene looking west from the South African Section. Photo by Ralph D. Cornell.

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the Editor's Page

PRAISE for our "new look" outweighing criticism by a comfortable margin, we are encouraged to press forward, however modest the pace.

The full story of *Camptotheca acuminata,* outlined in previous Arboretum Notes, is told in this issue by the man responsible for pursuing the camptotheca project, Dr. Robert E. Perdue, Jr., of the USDA Crops Research Division. In a recent letter, Dr. Perdue informs us that clinical trial of camptothecin is planned by the end of this year.

Advertising has come to Lasca Leaves in a form we believe does credit to its sponsor and to the Arboretum. Southern California Edison has accepted our outline for a series of ads illustrating research projects utilizing electrically operated equipment. Charles Kassler is the photographer for this present ad as he was for the superb color shots of the three hibiscus that graced the cover and inside pages of our last issue.

Speaking of hibiscus, Ross Gast concludes his memoirs of a hybridizer with an account of his visit to the Mascarene Islands, particularly the island of Mauritius, which we must confess we thought was located in an old Marx Brothers movie. Having learned from Ross' article its true site and its significance as the locale of the ancestral species of hibiscus, we have become sufficiently Mauritius-conscious to note two additional facts of interest: the island was the home of the dodo, the flightless extinct bird; and just a short time ago it became an independent nation under a prime minister by the name of Sir Seewoosagur Ramgoolam.

Arboretum notes

"They're changing the guard at Buckingham Palace — Christopher Robin when down with Alice."

ONE can wonder if A. A. Milne thought of the parade steps of England's busby-pated sentries as other than a child's delight or ritual ceremony for tourist cameras, but in our fevered world it takes no great imagination to see them as a symbol of orderly change.

Last June, two positions were exchanged on the highest acting governing body of the Department of Arboreta and Botanic Gardens. Retiring as president of the Board of Governors was Ralph Cornell, dean of Southern California landscape architects; elected to his seat was Maurice Machris, a retired oil magnate who has spent the past fifteen years vigorously pursuing his interests as naturalist, conservationist, and world traveler.

For Ralph Cornell, returning to the ranks alongside the twenty-four other Board members was like a chief executive returning by parliamentary inclination, if not procedure, to the senate from whence he came. (The code says Board members shall serve for a term of three years; it is not explicit about the length or number of terms a president may serve.) Mr. Cornell is one of fifteen original members appointed by the Board of Supervisors in 1953 when the Department of Arboreta and Botanic Gardens was established, and shares with a few others the longest period of service on the Board of Governors.

For Maurice Machris, the presidency passed to him seven years after his appointment to the Board and added another dimension to an impressive list of twenty-two affiliations which includes such disparate organizations as the Beverly Hills Wine and Food Society, the International Oceanographic Foundation, the Los Angeles County Museum, and the East Africa Wildlife Society.

Like several other members of the Board of Governors, Ralph Cornell is also a member of the Board of Trustees of the California Arboretum Foundation. Inevitably, some confusion and question has arisen from the presence of two closely associated boards having instances of common membership.

The situation came about naturally enough. The California Arboretum Foundation and its Board of Trustees were operating the Arboretum before it became a facility and department of Los Angeles County. When the department was formed, the Board of Supervisors became the top governing body, followed by a Board of Governors which it appointed, followed in turn by a director appointed by the Board of Governors. It was logical for the Board of Supervisors to find prospective appointees to the Board of Governors from among the Board of Trustees of the California Arboretum Foundation. From this time on, the CAF gave up its role as manager of the Arboretum to direct its full attention to its role as a citizens supporting group. Essentially the same thing happened with the private groups supporting Descanso Gardens and South Coast Botanic Garden.

It was equally logical for Ralph Cornell to be a key figure on the two boards by reason of his special qualifications. On the academic side he holds a BA from Pomona College and an MLA (Master of Landscape Architecture) from Harvard. In the field, his achievements span

a career over half a century long. To tick off a few, for thirty years he has been the supervising landscape architect at UCLA and, for nearly as long, at Pomona. He has been directly responsible for the layout of some twenty-five Southern California city parks, including the master plans for Los Angeles' Griffith and Elysian Parks.

He and Maurice Machris share at least two interests and talents. Both are expert photographers, both are engaging public speakers. Color photos by Cornell are regularly found in a wide assortment of horticultural and landscape magazines. Almost as familiar is a Cornell illustrated lecture. Machris' specialty is 16mm movie photography. According to his own estimate, he has shot close to a million feet of film in the course of his world travels. A good part of this footage covers the wildlife of Africa, but it also includes the first underwater 16mm film in cinemascope and a dozen educational films, five of which were made for and donated to the Los Angeles County Museum.

An energetic, gregarious man, Maurice Machris, or Maury as he is known among his friends, has the kind of background that promises to make him an outstanding president of the Board of Governors.

With Ralph Cornell, our director Dr. William S. Stewart, and members of both boards, we offer our salutations and best wishes.

Research Building

THERE are all kinds of gaps in our current life not the least of which is the gap between the recognition and the filling of a need.

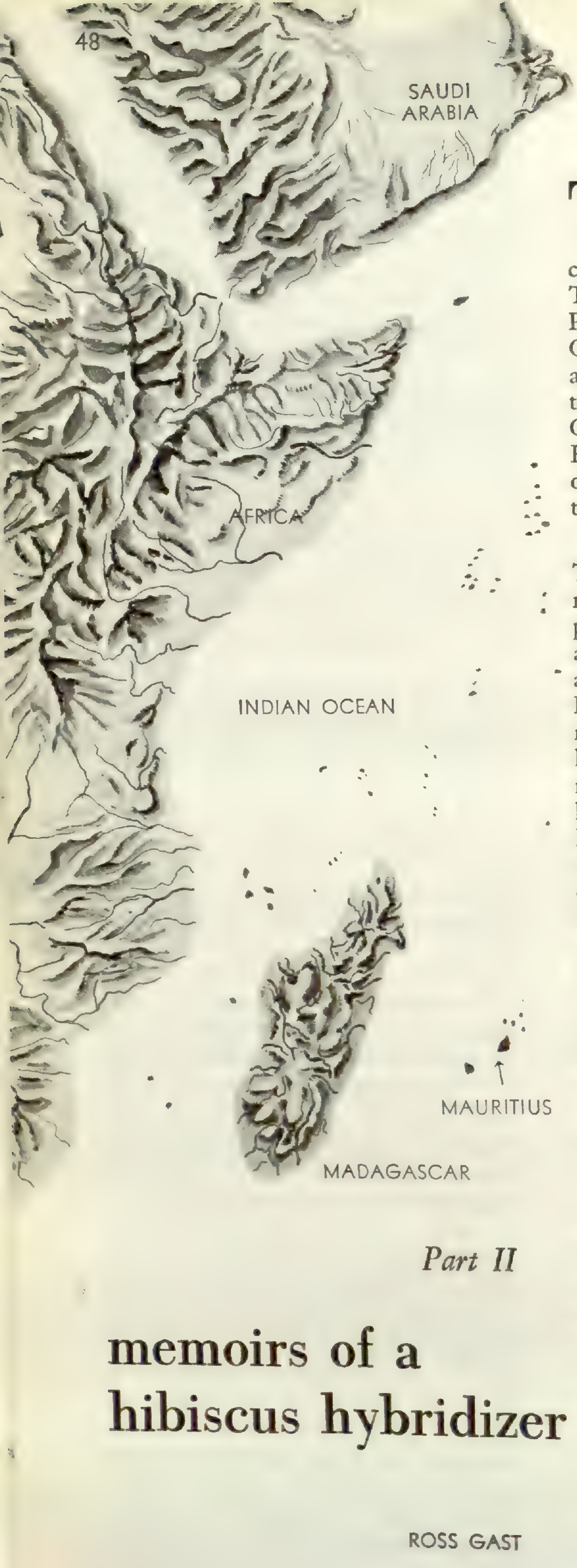
Recognition, of course, is the easy part, and the need for adequate research space at the Arboretum has been recognized for a long time.

News that the county Board of Supervisors had bridged the gap by awarding a $283,000 contract to build a research laboratory and that construction would start October 14, was greeted by the Arboretum staff with happy awareness that the difficult part had been achieved. In about nine months, researchers who have been working in basement and other makeshift quarters will move into a laboratory of 8,190 square feet where they can pursue such subjects as plant pathology, physiology, cytogenetics, ecology, chemistry and entomology in greater depth and with promise of greater public benefit.

A new laboratory inevitably calls for new equipment, some of it highly sophisticated and most of it expensive. As in the past, individuals, garden clubs, and the Arboretum District of the California Garden Clubs through the California Arboretum Foundation, have eased the burden by contributing over $5,000 toward filling this need.

Horticultural Show-Biz

WHEN a horticulturist can become a star on the educational TV circuit and receive a four-page spread in Life magazine, we should be reassured that if things in the country seem to be going to pot, it is not necessarily bad. Thalassa Cruso, an English lady from Boston with a keen sense of theater and boundless enthusiasm for her subject, is the horticulturist who has attained this enviable position. On her half-hour show, "Making Things Grow," (KCET, Ch. 28, Mondays, 7:30 p.m.; repeats each Sunday at 8 p.m.) Miss Cruso demonstrates potting techniques and dispenses gardening advice with a mixture of whimsy and science that makes the raising of plants an attractive and accessible pastime for laymen. "Making Things Grow" is scheduled to continue through March 1969.



THE Mascarene Islands lie deep in the South Indian Ocean, roughly 1,200 miles off the South African coast and 500 miles beyond Madagascar. They were discovered by and named for Pedro Mascarenhas, one of Vasco de Gama's captains, on the Portuguese voyage of discovery that opened the Europe to Asia sea route around the Cape of Good Hope. Mauritius, Reunion and Rodriguez are the most important units of the group. At the time of discovery the islands were not inhabited.

The Portuguese did not colonize Mauritius, but for 100 years it was an important port of call on the long voyage around the Cape of Good Hope to India, and the Portuguese trade routes of the East. When the Dutch took over Mauritius in 1598, all that the Portuguese had left behind was a few domestic animals, some plants, and a colony of monkeys. The Dutch built a fort and established a small port colony, but not until 1638 did they bring in any number of colonists. It is an interesting footnote to the history that from this tiny island Abel Tasman, the Dutch explorer, sailed to discover the Australian continent.

Dutch interest in the Mascarenes also waned, however, and in 1715 the French assumed control. They aggressively developed the fertile but rocky land, introducing sugar cane, now the principal crop with 200,000 acres in production. During the long wars between France and England, the French privateers used Mauritius as a haven from which they harassed English shipping, and in 1810, the British captured Port St. Louis, the capital. At this time, Mauritius is a British Crown Colony, but the island remains largely French in language and habits, and land ownership. Reunion, 90 miles southwest of Mauritius, is still a member of the French Community.

The French imported African slaves as field labor, but in 1838 the English plant-

Part II

memoirs of a hibiscus hybridizer

ROSS GAST

ers began to bring in Indians. Today, of the 750,000 people crowded on the 720 square miles of Mauritius, 450,000 are Indians, and the birthrate is increasing each year. However, the colony of monkeys left by the Portuguese 300 years ago has not grown any larger; they have limited their numbers to the food sources available to them. Considering the precarious future of the world food supply, this fact suggests a study in depth of birth control as practiced by this group of assertedly sub-human colonists.

We visited the Mascarenes for the first time in 1965, and again in 1967, timing our visits to the blooming season of their indigenous hibiscus, November and December. As there was little reference material on the Mascarenes available on the West Coast, I stopped over in Europe to study Mascarene herbarium specimens in London, Edinburgh and Lisbon. In these herbaria I found specimens of *H. liliiflorus* and *H. fragilis*; the original material of *H. boryanus* is in Geneva, but Bory-St. Vincent's printed description was carefully studied. Material in these herbaria showed both deeply cut, three-lobed leaves and entire leaves as well under the labels of both *H. liliiflorus* and *H. fragilis*. The reason for this was not made clear by collectors, and it was not until I located a study made of the Mascarene species by the British botanist, Sir Isaac Balfour, in 1878, that I learned that heteromorphism in foliage is a characteristic of Mascarene flora, and particularly in their native hibiscus. So I was prepared to find these plants with several different leaf forms, the deeply cut leaves generally appearing as the juvenile leaf form, and the entire leaves as adult.

In our studies in Europe, our attention was also directed to the work of Charles Telfair, a resident physician on Mauritius, who made the first recorded crosses between *H. liliiflorus* and *H. rosa-sinensis* as early as 1828. His hybrids, described in detail, and pictured in watercolors by his wife, were sent to England where they were propagated. Reports published on Telfair's work stimulated interest in the hybridization of ornamental hibiscus, the first recorded activity of this now popular garden hobby. Telfair was a dedicated plantsman, and collected plants throughout the Mascarenes, on Madagascar, and even the African East Coast, sending them to Kew. He also designed and developed public gardens in Mauritius.

Our interest in the South Indian Ocean species was also due to bibliographical and genetic evidence that this area might well be the ancestral home of the forms of hibiscus now placed within the *H. rosa-sinensis* complex. Hochruetiner, who published extensively on the flora of Madagascar and on the Malvaceae as a whole, places *H. rosa-sinensis* within the section Lilibiscus, and offers the suggestion that this section has its origin in hypothetical Lemuria. Lemuria is said to be an ancient sunken continent of which the Malagasy claim only Madagascar remains emergent.

MAURITIUS is now a regular stop on the long (4,000 miles) Johannesburg-Perth (Australia) hop over the Indian Ocean, and as we were ticketed around the world on our first visit via the Pacific, it was on our scheduled itinerary. The flight took us over the southern end of Madagascar, the "Great Red Island," and as it came into view below, the coloring of this heavily eroded land gave reason for its name. Also, its great size is realized when seen from the air; it is the world's fourth biggest island, a third larger in land area than California, stretching down the South Indian Ocean for nearly 1,000 miles.

The first sight of Mauritius from aloft was rather disconcerting; its postage stamp size seemed to belie its prominent role in history, and further, it appeared to be almost entirely under cultivation,

giving reason to believe that areas of native vegetation were limited. This indicated that we were not going to have the problem of organizing any extended plant-hunting activity in the wild.

It has been our experience over many years, however, that in old, established lands, one is most liable to find the plants one seeks in old public or private gardens rather than in the wild. Later this proved to be true on Mauritius; collection sites given for the specimens we sought had long been given over to sugar cane or housing. Such areas as were still uncultivated were privately owned and for the most part reached by roads not open without permission, and permission always seemed to be the prerogative of an owner not presently on the island.

ONE of our first contacts was Captain Henry Adam, who had been Chief Forester on Mauritius for 25 years. Although not a botanist, he was interested in the reasons for our visit. He was sure that *H. liliiflorus* was no longer to be found in the wild. He then recalled that many years before he had brought down two trees of a hibiscus producing orange-red flowers, and had planted them in a small botanic garden in Curepipe, a town close by. This garden was developed a hundred and fifty years ago by Charles Telfair. We found the trees in extremely poor condition, one of them definitely in decline. Both were 15 feet in height, with trunk diameters of 4 and 6 inches. In form they branched freely low on the trunk and at one time were undoubtedly full branching in habit. Much of the outer growth on one tree was dead, however.

Fortunately, both trees were not only in bloom, but seed pods were set and we were eventually able to secure seed as well as propagating material. Plants from the latter have been bloomed at LASCA.

Early literature describes *H. liliiflorus* as a bright red, but the blooms of the Curepipe trees should more properly be called orange-red. They are vase-like in form, 2½ inches across, with little if any over-lap of the petals, and there are several lighter colored radial stripes on each petal. The most outstanding characteristic of the flower, however, is the marking on the reverse side of the petals; an even half of the petal, up and down, is distinctly yellow in color.

APPARENTLY this characteristic is dominant for it is present in almost all hybrids with *H. liliiflorus* ancestry, even to the fourth or fifth generation.

Captain Adam also suggested that we contact Dr. R. E. Vaughn, a retired teacher of botany, through the Mauritius Sugar Research Institute, at Reduit. We were fortunate in locating Dr. Vaughn who, as a retirement activity, is the Curator of the Mauritius Herbarium, a part of the Institute. Dr. Vaughn informed us that there were two more trees of a native hibiscus in the Royal Botanic Garden at Pampelmousses. I found these trees after some difficulty (there were no records of them in the Curator's office) and while they differed in form from the Curepipe trees, the leaves and flower were much the same. The trees were columnar, some 25-30 feet tall, with trunks measuring 10 inches in diameter. There also was another morphological difference, and an important taxonomic one: the leaves formed tight clusters at the branch terminals, a characteristic noted in the several herbarium specimens of *H. fragilis* studied in Europe. In the absence of ac-

cession records, the origin of these trees cannot be definitely established, but it is quite possible that they were brought to Pampelmousses from Reunion by Charles Telfair, who collected on Reunion for Mauritius gardens 150 years ago.

On our first visit to the Indian Ocean areas, we also spent a few days on Madagascar. This island has not been extensively botanized but a large number of hibiscus species have been found there. While at Kew and other European herbaria, we checked these and several of them appeared to be quite close to the hibiscus with which we are working. From these materials, and from library references, we took notes on collection sites, etc., in the hope that we might find at least a few of these species.

Of particular interest to me, however, was *H. cameronii,* a species found on Madagascar which has figured prominently in printed literature on the development of ornamental hibiscus. Due to printing errors in early horticultural publications, this species was confused with a hibiscus now considered a hybrid, so that in recent years it has been included in the group which is compatible with the forms known to be the progenitors of *H. rosa-sinensis*. We have had this species for several years, but have not been able to make successful crosses with the species with which we are working. It was our hope that there might be other forms of *H. cameronii,* some of which might be of commercial interest locally, so it was included in our list.

HOWEVER, even before we left London we had begun to have reservations as to the wisdom of our proposed visit to the "Great Red Island." The rainy season would be due at our planned arrival time, and we were told that travel would be difficult by air as well as by road. Another problem was visas: the French are no longer rulers of Madagascar — it is now the Malagasy Republic, one of the so-called "emerging nations" and extremely nationalist in its attitude toward visitors. We spent most of three days at the Malagasy Embassy in an attempt to convince the staff that we had no subversive reasons for visiting their homeland. Later we learned that due to their experience with previous English and American plant hunters, who, they said, disregarded new plant collection regulations, such characters were suspect. But for a time I felt that the Embassy staff had checked on my past and learned that before retirement my business activities had resulted in the loss of thousands of dollars annually in the export return to Madagascar. For, beginning in 1939, I had developed and introduced "Twist-ems," the paper-covered wire tie, on a world-wide basis and it soon replaced raffia, the source of much of the Malagasian export revenue!

On our arrival in Tananarive, we learned that the collection sites for the hibiscus species we wanted were several hundred miles away, and not accessible to us at that time due to weather conditions, and absence of road transportation. We did see *H. cameronii* in its native habitat, however, and found it to be no different than our own stock.

Actually, our visit to Madagascar was little more than a tourist jaunt, but well worthwhile from that standpoint. We were able to establish some contacts for our Arboretum, but due to the uncertainties resulting from the changeover from French rule to self-government, there is no assurance that these

A distinctive characteristic of the Mascarene hibiscus species is the marked change in leaf form as the plant develops from seedling to maturity. The above photo shows leaves at three stages in the growth of *H. liliiflorus:* left — juvenile; center — intermediate; right — adult. That this character is dominant is seen in leaf forms shown in the photo at the bottom: Top left — *H. liliiflorus x H. schizopetalus;* top right — *H. liliiflorus x H. denisonii; lower left — H. liliiflorus x H. kokio;* lower right — *H. liliiflorus x H. rosa-sinensis.* The *H. rosa-sinensis* used in the latter cross was an F_1 hybrid, with *H. arnottianus* as one parent.

contacts will prove fruitful in the near future.

WITH two of the Mascarene species already being used in our hybridizing program, the third, *H. boryanus,* was the only remaining hibiscus on our "want" list of cross compatible species. Therefore, when Dr. Vaughn wrote me from Mauritius in the summer of 1967 that he was organizing a plant hunting visit to Reunion in November, and asked me to join the party, I accepted. We made the trip by the way of Durban, South Africa, where we stopped over to see some of our seedlings growing at the local botanic garden.

Reunion Island is only slightly larger than Mauritius and like the latter, is a "sugar island," with most of its arable land given over to sugar cane. Its history is much the same as that of Mauritius, except that England returned this island, then known as Bourbon, to the French in 1810. It now has a population of about 450,000, most of whom are creoles — the French brought in labor from Africa rather than India. As the French are quite generous in their public expenditures on Reunion, the standard of living there is much higher than on Mauritius. In fact, it is really a tropical paradise, at least in the lower elevation levels, and much visited by French tourists.

Again we stopped over in London to review the known facts about *H. boryanus* and the collection sites given by Bory-St. Vincent, who first found the species. He called the flower color *albidi* — which is Latin for white, or more exactly, whitish. Other morphological characters, however, placed it quite close to *H. fragilis* and *H. liliiflorus.* Another botanist, DeCordemoy, who described the species later, called the flower yellow. We therefore believed that if we found the plant, it would have a flower much like *H. fragilis,* which, although a light orange in face color, has a light yellow coloring on the reverse of the petals.

The collection site given by both Bory-St. Vincent and DeCordemoy was at the 5,000 foot level in the saddle between two great mountain masses in the central area of the island, one of them an active volcano. Living conditions in this area were very primitive, but we were able to secure lodging in a small inn several miles from our collection sites. We could not remain in the woods after noon, for about one o'clock the fog rolled in and it was not possible to remain away from habitation as it did not clear until late at night.

After several days' search without success, I gave up and we returned to the capital, St. Denis, to wait for the weekly plane back to Mauritius. That our standard fare was horse meat made the decision easier.

FORTUNATELY, a Reunion Department of Agriculture official who had been our guide, became interested in the species I was seeking, as he had never heard of it before, and kept his eyes open. On the day of my departure he brought me cuttings of a hibiscus which he had found at lower levels, several miles from the published collection site. He also found two ripe seed pods, and seeds from these pods are now germinating in our Arcadia greenhouse. Meanwhile, final identification of this hibiscus is being made by Dr. Vaughn. It has all of the morphological characteristics given in the DeCordemoy description of *H. boryanus,* however, and we feel that it will be so placed by Dr. Vaughn. Also, from our own study of herbarium speci-

mens and first-hand observations, we believe that the taxonomic treatment of the Mascarene species may be revised and, like the native Hawaiian *H. arnottianus,* all of them will be grouped together as one species, with several forms.

On our return from the Mascarenes in 1967, we visited South Africa and Rhodesia. In Salisbury, Rhodesia, we saw hibiscus grown as standards as street trees. This use had been noted in Nairobi, Kenya, during a stopover there in 1965. This particular plant form was extremely popular in English greenhouses a century ago, and, although a highly desirable street or dooryard tree, it is used only in a limited way in Southern California. However, we are now selecting cultivars especially suited for this purpose, and these will be introduced soon.

WITH the long "lost" Mascarene species now in our hands (but as yet not fully identified), our objective of establishing the most representative collection of ornamental hibiscus to be found in any arboretum or botanic garden in the world has been reached. This status has a two-way advantage: it allows us to carry forward our own program under the very best conditions, and also creates good will through our ability to supply propagating material to other institutions such as ours.

Some of my friends question my dedication, particularly to one plant family, for so many years. But they cannot appreciate the satisfactions which are to be found in such an interest, or, more on the pragmatic side, its therapeutic values. In retirement such an activity gives reason for getting up each morning, for there are always new blooms to be seen on the greenhouse benches, and records to be consulted so that these blooms may be properly classified and, later, evaluated. And there is enough physical effort required in nursing the "youngsters" along to take the place of golf or other activities so popular with the over-seventies. Most important, it is an interest which, although subjective in motivation, does allow one to use his energies in a useful, constructive way.

For it is my long-held conviction that those who have been fortunate in the business or professional world owe a debt which should be repaid in service which is truly meaningful. Here I can best express my feelings by quoting from an obituary of the Honolulu businessman and flower lover, who, although our personal contacts were few and our correspondence limited to a few years before his death in Honolulu in 1947, nevertheless set goals for me in his own life and work with plants:

"Some men leave living memorials when they pass to the Great Beyond to perpetuate the enjoyment of beauty in nature. John A. Johnson, native son, dead at 74, has left for himself such a floral monument in the amazingly varicolored forms of hibiscus which he has created in the past fifty years. . . .

"Here amongst us lived a mild spoken, earnest worker, by profession an accountant, never assertive, but steadfast and honest in the performance of his duty. . . . Only his friends knew that other side, the perpetuation of dreams by making natural beauty more beautiful in his flowers."

(This is the second part of a two-part article.)

CAMPTOTHECA ACUMINATA — *Source of Promising Cancer Drug*

Robert E. Perdue, Jr.[1]

WHEN a USDA collaborator collected seed of an unidentified Chinese tree, he could hardly have surmised that his harvest was the original source of a promising drug for treating cancer. This small handful of seed, collected by Prof. A. N. Steward, College of Agriculture and Forestry, Nanking University, was accompanied by an unimposing note, "No. 75. Collected on a rocky slope at 600 ft. altitude in Chang An, Yung Hsien. A tree with green fruits." This was the first in a chain of events that led to the discovery that *Camptotheca acuminata* is the source of a potentially valuable drug.

Steward's seed were received by USDA in April, 1934, and planted under glass at the Glenn Dale, Maryland, Plant Introduction Station. They were immature and their germination was an initial stroke of the good fortune that has shadowed our experience with this plant.

Had the identity of Steward's seed been known at the time of their receipt it is unlikely they would have been planted. *Camptotheca acuminata* had been introduced on two earlier occasions. Plants were available to the nursery trade in California, but they had not met with favor. The seed were planted, however, to grow specimens for identification and to provide living specimens for evaluation if this later proved desirable.

The Maryland environment was too rigorous for this plant. When young specimens were well established and ready to be planted out, several were forwarded to Chico, California, Plant Introduction Station. Two plants survived at Chico and now are small trees about 25 feet tall.

The Chico trees became only two unobtrusive specimens in the permanent planting. They were of little evident value. Their performance suggested they would be of little value as shade trees and of considerably less value than other easily grown species. They were permitted to remain in place only because the space was not needed for other plantings.

In 1950 USDA began a search of the world's plant resources for species that produce chemical substances that can be converted to cortisone. In initiating such a program chemical laboratories can be equipped rapidly, but plant materials can be procured only as nature permits and field projects can be planned. To avoid delay in getting the cortisone program under way, procurement of plant materials was directed first to the most accessible sources. Included were Plant Introduction Stations in California, Florida, and Georgia, which maintain in permanent plantings hundreds of species from the more than one-quarter million plant introductions brought into the United States during the past 70 years.

Camptotheca acuminata was among the plant materials supplied by the Chico Station for the cortisone program. An

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extract of leaves was negative in a test for cortisone precursors. The unused extract was placed on the laboratory shelf where it remained for almost six years.

WHEN the Cancer Chemotherapy National Service Center of the National Cancer Institute began screening plants for chemical substances with cancer-inhibiting capability, screening facilities were immediately available but again plant materials could not be provided until nature's schedule permitted. This time scientists turned to the old plant extracts prepared for the cortisone program. It was recognized that some of these extracts undoubtedly had deteriorated but it was considered advisable to get the new program under way as promptly as possible. Many old extracts were tested in 1957, including that of *Camptotheca* leaves. This extract was active in two tumor systems but the supply was inadequate to complete the required series of tests.

The Chico Station provided new samples of *Camptotheca* leaves and twigs in May 1961. These and a sample of leaves collected in September of the same year were inactive. But tests of September collections of twigs and fruit were very rewarding. Not only did the extracts pass the ensuing tests but at a level well above that considered marginal.

Of particular importance, the extracts were active against the highly selective Lymphoid Leukemia L-1210 test system that detects little activity in the broad array of plant materials tested. Activity against L-1210 in laboratory animals is highly valued as this system appears highly predictive for anti-cancer activity in humans.

To assure a supply of material to continue chemical research, a limb was removed from one of the Chico trees and separated into individual samples of bark, bark-free wood, and twigs. Bark and wood samples showed the same anti-tumor activity as the original collection and the 1961 samples of twigs and fruit.

And again good fortune. It was evident that the active constituent was most abundant in the woody parts of the tree. Had the active constituent been concentrated primarily in the leaves, the *Camptotheca* story could have been very discouraging because the yield of leaves is very low. Leaves represented less than 10% of the total weight of the limb removed from the Chico tree.

By late 1963 intensive chemical research was under way to isolate and identify the substance responsible for *Camptotheca*'s anti-tumor activity. This phase of the research was completed by a team at the Research Triangle Institute, Durham, North Carolina, led by Dr. M. E. Wall. In March, 1965, Wall isolated a minute quantity of a pure crystalline substance, "camptothecin," which reproduced the anti-tumor activity of crude *Camptotheca* extracts.

Camptotheca acuminata seed normally ripens in November.

It was evident that the two trees at Chico would not provide adequate raw material to complete the critical research still necessary unless both were completely removed. The interior of mainland China was off limits to American botanists and consequently could not be considered a source of supply. As far as was known at that time the Chico trees were the only living specimens in the United States and possibly the only specimens available in the free world. It was obviously unwise to destroy this critical seed source for it could conceivably prove to be the only supply of propagating material should expansion of production become necessary.

WE began a systematic survey of West Coast locations that might have one or more living specimens. Botanists and horticulturists from Southern California to Washington were contacted, including staff members at colleges and universities, botanical gardens, nurseries and city parks. This search led eventually to the location of about 30 trees, most fairly small, in Central and Southern California. Arrangements were made to uproot and remove most of these trees as additional material was needed to continue the chemical research. But again a question — would it be advisable to eliminate this still limited supply of raw material? Or should we cut only the required amount of material as new supplies were needed? Would severe pruning kill the trees? A decision was postponed as we awaited other developments.

During the fall of 1963, Chico horticulturist R. L. Smith succeeded in germinating seed from the 1963 crop. Unlike seed of many uncultivated trees and shrubs, *Camptotheca* seed germinated readily. About 300 seedlings were transplanted to the field the following spring after threat of frost was past. These seedlings grew rapidly. By August, 1964, they were about 18 inches tall with woody stems about one-half inch in diameter.

Now a question of critical importance to future supply had to be faced. Would the active constituent of mature well-developed trees be present in these young seedlings? Or would it be necessary to wait 5, 10, or more years for more mature growth to develop? In September, 1964, a representative sample of seedlings was removed and submitted for tests. They were active. Camptothecin seemed not to be present in as great abundance as in more mature growth, but it was evident that it was available in workable quantity. On the basis of this and other tests there was now good reason to believe that the active constituent was present in the plant at all stages of growth, in most parts of the plant, and during all seasons of the year. Future supply was reasonably certain.

During the late summer of 1965, we harvested most of the California trees then known to us, except those at the Chico Station. These trees were from about 15 to 33 years old, from 18 to 54 feet tall, and with trunk diameters of about 5 to 10 inches. The harvest was limited to trees that had not produced viable fruit and consequently were unlikely to serve as seed sources. Other specimen trees have since been located and harvested, including several in a Taiwan botanic garden. We have harvested most of the initial small planting made at Chico in early 1964. During late 1967 we harvested half of 1,200 seedlings set in the field at Chico during the spring of 1966. (Ed. note: The need for mature specimens grew during late stages of certain key tests. In response to this need, the Los Angeles State and County Arboretum last April donated a 35-foot tree, one of two *Camptothecas* in its collection.) The supply of raw material now on hand is adequate to provide a basis for isolation of sufficient camptothecin for all research leading to, and including, at least the preliminary evaluation in human cancer patients.

Camptotheca acuminata seedlings planted in hedge rows May 1966.

Average about 2 inches in diameter and 12 feet in height.

Approximately ½, or 500, trees of this planting were harvested, roots and all, last November for extraction of camptothecin. The seedlings were originally planted in rows 4 feet apart. Every other row was harvested, leaving the trees on 8 foot rows. The next harvest will take every other tree in the row, leaving them spaced 6 feet apart.

There are an additional 10,000 trees (1 and 2 years of age) that are being grown to supply raw material for extraction when needed.

Additional plantings, each of 5,000 seedlings, were established in the spring of 1967 and 1968. These plantings should be more than adequate to provide raw material to assure adequate quantities of the drug during the course of clinical research. Seedlings from the 1964 planting were reserved as a future source of seed. Viable seed, suitable for planting, will be available from the best of these trees in late 1968.

Chemists are endeavoring to synthesize camptothecin and the chance of their success is good, though by no means assured. If they are unsuccessful, or their synthesis is not economical and camptothecin becomes a useful drug, American agriculture can supply an almost unlimited amount of raw material. Our plantings of *Camptotheca* have been designed to provide raw material to assure adequate supplies of camptothecin for further chemical, biological, and medical research. We have taken advantage of this opportunity to learn as much as possible about the agronomic performance of the plant. Small scale experiments are providing preliminary data on the effect of fertilization, spacing, and other agronomic factors. When new seedlings are harvested, stumps will be left in the field to determine the plant's ability to coppice.

Camptotheca grows rapidly, especially during its first 10 years. The two mature trees at Chico produce enough seed to plant about 10 acres per year at a rate of 7,000 seedlings per acre. Plantings at this spacing will yield about 7.5 tons of air-dry woody raw material per acre after three growing seasons. Yields can be increased by wider spacing. It appears that average annual production will also be increased by delaying harvest until at least the end of the fifth season. The demand for raw material for production of camptothecin has not permitted us to hold any planting beyond three growing seasons. The plant's growth characteristics assure that it is adaptable to mechanical harvest.

CLIMATIC data for Chinese weather stations in the natural *Camptotheca* environment, information on crops grown in the same area, and our experience with the tree at Chico indicate that *Camptotheca* is adaptable to cultivation in the milder regions of the United States. The tree should grow well on the southeastern and Gulf coastal plains as far north as North Carolina and southern Oklahoma. It grows well in California at least as far north as Chico. In China the plant thrives in humid areas with rainfall of 40 to 80 inches per year. Yet, once established, it grows well without irrigation in dry areas of California.

We are attempting to locate new *Camptotheca* germ plasm in foreign botanical gardens in the hope that plants of different genetic stock from that now available will yield larger quantities of the desired substance. Should demand warrant an intensive research effort, selection and breeding investigations will be undertaken to develop even faster-growing varieties that will yield significantly higher amounts of camptothecin.

The future of camptothecin as a useful drug appears bright. But it is by no means assured and much remains to be accomplished. Preclinical pharmacological evaluation in dogs and other animals indicates that the drug will not produce serious undesirable side effects. We anticipate that it will be cleared for clinical testing and that clinical evaluation will begin as soon as adequate supplies of camptothecin can be accumulated.

If chemists are successful in developing an economical synthesis of camptothecin, there will be no direct rewards for American agriculture. Nevertheless, if the drug is added to modern medicine's armament against cancer, *Camptotheca acuminata* will take a place as another classic example of the rewards to be achieved by the introduction of foreign plant species and the chemical and biological evaluation of our plant resources.

the box ORANGE

Ross Goodrich

A shrub worth investigating

ILLUSTRATED here is a plant of *Severinia buxifolia (Atalantia buxifolia),* one of several on the Arboretum grounds. The common name is box orange and it does look like boxwood. A beautiful small shrub with bright green foliage the year around, it has attracted about as much attention as a quiet neighbor that one doesn't fully appreciate until he moves away.

In the warmer sections of Florida, *Severinia buxifolia* is grown successfully and used in planter boxes, individual plantings, and as hedges. In Southern California it is scarcely known. It has many good qualities but its slow rate of growth may partly answer the question as to why it is so little used here. This plant has been fifteen years getting to three feet in height and six feet broad, so it wouldn't please hurry-up people unless they get plants already at the size they like; but it should make them happy by needing a minimum of trimming.

The plant's tiny blossoms neither add to nor subtract from its appearance and do not give it the messy look that boxwood has at blooming time. The blue-black pea-sized fruits, though interesting and not unattractive, generally hide in the foliage. It has none of the sloppiness that boxwoods get after spring rains or overhead watering.

Only slight frost damage has been noticed and this was in years when the lawn in the area was covered with frost for more than forty mornings each winter. However, real injury can come if the temperature gets to fifteen degrees F. It is not harmed by salt spray, though in the Arboretum this accommodation would hardly be needed. It is also very tolerant of high soil salinity, an advantage in any area of generally low rainfall.

This particular plant is in the Asian Section, near the road at the west end of the Upper Lagoon. It came to the Arboretum from the Hearn Nursery in Arcadia, as did two others that are on the northern edge of the bowl atop Tallac Knoll. These are close to other shrubs, partly under trees, and in a rather difficult spot to water, yet they have made it to two and a half feet in height and about four feet in width, giving an indication of sturdiness and adaptability.

These plants are a brachytic or dense-leaved horticultural selection. The wild type is represented by a plant on the south side of Tallac Knoll at the edge of the Economic Tree Section. Here a

Severinia buxifolia that came from the Riverside Experiment Station is a shrub of seven to eight feet in height with a spread of twelve feet. It has been faster growing, more thorny, and also generally less attractive than the others. It has larger leaves and one would expect them to hide the blossoms and fruits, but they do not because the growth is more open.

Three other plants from the Hong Kong Botanic Gardens are yet too small for such comparison, but even at their early stage of growth they appear to be the open, thorny type. They are located roughly one hundred feet from the illustrated plant; it will be interesting to see how they develop.

The range of *Severinia buxifolia:* Southern China south of the Tropic of Cancer, Hong Kong, Hainan Island and that much disrupted area we now know as Viet Nam, and Cambodia. It extends west as far as India, east to Malaysia and the Philippines, and north to Taiwan where it is found along the coast.

CALENDAR 1968-9

FLOWER SHOWS

Arboretum — **Arcadia**

November 1, 2, 3

11th Annual San Gabriel Valley Fall Flower and Garden Show

February 21, 22, 23

Temple City Camellia Society

Descanso Gardens — **La Canada**

January 4, 5

Winter Camellia Show, presented by Los Angeles Camellia Council

January 11

Rose Pruning and Planting Demonstration

CHRISTMAS EVENTS

At Descanso Gardens

December 7 through 15

Christmas Decoration Show, presented by Descanso Gardens Guild, Inc. Ideas for home decoration from around the world.

ART

At Descanso Gardens

December 17 through 31

Exhibit of oil, water and other paintings by Gerry Patten, former Arboretum staff graphic artist.

LECTURES

Free Native Plant Lectures presented by the Theodore Payne Foundation:

At Arboretum

January 24 — 8 p.m.

"Our Desert Wildflowers"

Dr. Edmund O. Jaeger, author and naturalist.

At Descanso Gardens

February 19 — 8 p.m.

"Early California and Indian Uses of Natives"

Mrs. Dorothy Pool, former supervisor, McCurdy Nature Center.

BOOKSHELF

Insect Pests of Farm, Garden, and Orchard, by Davidson and Peairs. John Wiley and Sons, Inc., N.Y. 587 figures or illustrations.

This book presents a brief review of the available information (up to 1966) on a wide variety of insect problems. It begins with a general discussion of the importance of insects to man, their structure, development and classification, and the various methods of control for the prevention of losses by insects. This is followed by a discussion of the major insect pests of various farm, garden, and orchard crops, including flowers, shade trees, and other ornamental plants. In addition, information is included on the insect pests of stored products and household goods and of those attacking man and domestic animals.

The book is designed primarily as a textbook for beginning college courses in applied or economic entomology. It should also be of value as a reference book for anyone seeking information about insects and pests of the major crops.

Harry G. Walker

The Endemic Flora of Tasmania. Botanical and ecological text by Winifred Curtis, paintings by Margaret Stones. 70 p. 38 colored plates. The Ariel Press, London. 1967.

The first of four proposed books on the subject by two ladies widely known and highly esteemed in their respective fields. Described by F. A. Stafleu, editor of Taxon, journal of the International Association for Plant Taxonomy, as ". . . a flower book of a quality and splendour which is almost unthought-of today."

Some Old Ranchos and Adobes, by Philip S. Rush. Published by the author, 1965.

A close-up view, probably typical, of a few early California ranchos, chiefly those of San Diego, Orange and Riverside Counties. Rancho Santa Anita is not included. A useful reference for the aficionado.

The Camellia Treasury, text and photographs by Mrs. Paul Kincaid. Hearthside Press, N.Y. 1964.

As the title suggests, this attractive book contains a wealth of information on the growing, care and esthetic uses of an ornamental shrub with a history dating back at least to 1735.

Wildlife in America, by Peter Matthiessen. Paperback, Viking Press, 1959.

A well-documented history of man's affect, mostly bad, on the wildlife of America from the Mexican boundary north. Seemingly every living creature on the continent receives the author's attention, including those that have vanished and those threatened with extinction.

American Men of Science, edited by The Jaques Cattell Press. R. R. Bowker Company, N.Y. 1965. 11th edition.

A convenient, six-volume biographical directory of America's scientists in all fields, summarizing their background, areas of interest, latest employment, and principal publications.

New Trends in Dried Arrangements and Decorations, by Mabel Squires. Photographs. M. Barrows and Company, Inc., 1967.

an ARBORETUM IS NOT ALL TREES

FIELD AND LABORATORY RESEARCH is a central part of life at the Los Angeles State and County Arboretum. One project hopes to reduce the fire-hazard presented by Southern California's chaparral-covered mountains and foothills by sorting out fire-retardant plants and making them available for planting on fire breaks. □ Using tongs, plant samples are held in this muffle furnace, electrically heated to 1200° F. Fire-retardant plants ignite in 18 to 25 seconds; others ignite in less than 6 seconds.

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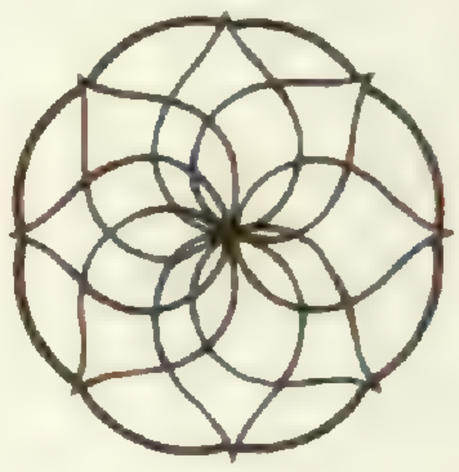

Lasca Leaves

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LITHO IN U.S.A.

Woman of California

SUSANNA BRYANT DAKIN

By W. W. ROBINSON

FEB 10 1969

IN MEMORY OF SUSANNA DAKIN
THIS ESSAY IS ISSUED IN PLACE OF
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Susanna Bryant Dakin

1905-1966

Woman of California

SUSANNA BRYANT DAKIN

By W. W. ROBINSON

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Preface

In the winter of 1967, a series of annual lectures was established in memory of Susanna Bryant Dakin. These lectures, presented under the auspices of The Bancroft Library at the University of California, Berkeley, were instituted and funded by Mr. and Mrs. Jake Zeitlin of Los Angeles, as a token of their devotion to Susanna Dakin.

The first lecture was delivered in December, 1967, by W. W. Robinson of Los Angeles. Published by The Friends of The Bancroft Library, in collaboration with The California Arboretum Foundation, Inc., of Arcadia, California, it is sent to you as a friend of these organizations. Susanna Dakin's staunch interest in the two institutions is well-known, and their cooperation in this publication is a happy tribute to her generous involvement in both northern and southern California.

WOMAN OF CALIFORNIA

Susanna Bryant Dakin

I am honored to be asked to talk or write about Susanna Bryant Dakin, greatly honored. This gently persuasive woman, who won the admiration and affection of so many of us, contributed her superior talents to all of California.

Everyone who knew Susanna Dakin was aware of her abilities, her cultural interests, her deep understanding, and the range of her activities. I met her in 1940, served on various committees with her—in both Southern and Northern California—followed with admiration many of her pursuits, and had brief glimpses of her home life in Pasadena, Belvedere, and San Francisco. That is perhaps why I am asked to attempt the portrayal of the woman so fittingly called "Susanna."

Through Lindley Bynum I met Susanna. I had read her *Scotch Paisano*, so knew something of her interests and the quality of her writing. I had also read a book—*Adobe Days*—written by a cousin, Sarah Bixby Smith, so was somewhat aware of Susanna's background. I was delighted when Lindley, then associated with the Huntington Library, told me that the two of us were invited to have lunch with Susanna Dakin at her Pasadena home. I remember the occasion well. The sherry, originating in the cellar of Henry E. Huntington—for Dr. Bryant, Susanna's father, was a friend and the personal physician of the railroad tycoon. The excellent food—for Susanna had a very good cook. The agreeable conversation—stimulated by the vibrant hostess.

Until 1951 Susanna Dakin was strictly a Southern Californian, and her activities were mostly Southern Californian. It is true, she wrote, in 1949, *The Lives of William Hartnell*, largely based on manuscript material in the Bancroft Library in Berkeley, an important historical contribution devoted to a many-faceted Californian whose home was in Monterey. This was a follow-up to *Scotch Paisano*, which had been based on Huntington Library manuscripts. During these Southern Californian years she was a heavy participant in activities literary, artistic, historic, and educational.

The Dakin family moved from their home on Rockwood Road in Pasa-

dena to the Bay Area, favored by Richard Dakin, Susanna's husband. Their first home there was on Belvedere Island. From Belvedere, Susanna wrote to a Los Angeles friend in April of 1956:

After a long time of homesickness . . . I now feel cheerful and full of the joy of living. For one thing, I had gallstones, enormous ones, which were taken out and thrown over the Golden Gate Bridge, along with all psychosomatic complaints, not long ago. The doctor said they started to form . . . about four years before when we moved from Rockwood Road, where I really had planned to live and die. . . . Mr. Knowland (the Senator's father, and editor, for many years, of *The Oakland Tribune*) is president of the California Historical Society and recently he appointed me chairman of the Special Publications Committee. We have some money, in a publication fund, and are not restricted to the Society's possessions. Let me know if you have pertinent ideas.

That appointment apparently helped to spark Susanna Dakin's active participation in Northern California activities—an ever widening participation. It marked the end of a transitional period when she made so many north-south trips that some of her southern friends on the Arboretum committee hardly knew she had moved away from Pasadena. Seven years later she could write to the same Angeleno correspondent that she had sunk her roots in the Bay Area.

Reviewing Susanna's life, interests, and writings, divided between Southern and Northern California, we must describe her as a "California woman." Equally at home in all parts of the state, equally concerned with everything Californian, she was completely free from narrow regionalism. She led a life amazingly balanced between the areas dominated by San Francisco and Los Angeles.

Without attempting to do a Who's-Who biography or to set forth a bibliography, I want to touch upon some of the activities and interests that were part of Susanna's life, as well as give a closer look at the books she has written or made possible.

But first, what of her family background, very pertinent to the development of her own life! Her Canadian-born father, Dr. Ernest Bryant, went to Los Angeles in 1891 and became the city's Police Surgeon at the age of 22. From the first he felt at home in the City of the Angels, "where the warmth

and informality of daily life corresponded to qualities in his own nature." (There I quote from Susanna's own account of her father.) He learned to play golf and became a member of the Los Angeles Country Club where Los Angeles "Society" congregated. One afternoon he met a delightful young woman who was on a brief visit from San Francisco—Sue Bixby. Sue, destined to be Susanna's mother, had vowed: "I'll never live in Los Angeles. I'll never marry a doctor, nor a fat man." But when she married Ernest Albert Bryant, she did all three, except that Dr. Bryant was only slightly overweight from being somewhat of a gourmet and from being invited out to six- and seven-course dinners every night. Dr. Bryant met Henry E. Huntington at the peak of the latter's wealth and power and became his personal physician. Later he served as Surgical Director of the Southern Pacific Railroad, Southern Division. It is interesting to note, in the light of the Dakin family's later interests, that Dr. Bryant founded the Good Hope Clinic of the Hospital of the Good Samaritan in Los Angeles.

Susanna's mother was Sue or Susanna Bixby—the little Sue of Sarah Bixby Smith's fascinating *Adobe Days*, the daughter of John W. Bixby, one of the owners of Rancho Los Alamitos and the sister of Fred H. Bixby, later owner of the Alamitos. John Bixby came from Maine in 1870, many years after his cousins Jotham and Llewellyn had made that same migration. These earlier Bixbys, with their cousins Benjamin and Thomas Flint, had driven 2000 head of sheep from the Mississippi River to the West Coast in 1852. They first bought Rancho San Justo in Monterey County and had entered also the stage-coaching business. Presently, Southern California land tempted them, as it did other Northern Californians, for there were great bargains in ranchos available after the three-year drought of the 1860's had bankrupted the Spanish-speaking rancheros. In time the Bixby name became associated in ownership of Ranchos Los Cerritos and Los Alamitos—the two comprising all of present-day Long Beach—along with the greater part of Rancho Los Palos Verdes. For a brief period in the early 1860's the Bixbys and Flints had owned all of what is now the huge Irvine Ranch. The story of the Bixbys is the story of one of California's great land-owning families of the early American period. Rancho days therefore were a part of the early experience of Sue Bixby and of course of her daughter Susanna, who was to write extensively of rancho living. Sue Bixby went to a "finishing" school in Boston, had a European

tour, and later—unwilling to live on Los Alamitos with an ever-grieving, widowed mother—she chose an apartment on Russian Hill in San Francisco. There she found Bohemian friends until Dr. Ernest Bryant entered her life, married her, and brought her back to Los Angeles.

Sue Bixby, it is well to remember, was a woman fond of books and paintings. The library she formed and that was finally given to Scripps College was broad in its coverage. Also, she had strong botanical interests and became the donor of the Santa Ana Botanical Garden for Native Plants, now in Claremont, foreshadowing the daughter's interest in the Los Angeles State and County Arboretum. She was also a backer of Theodore Payne, who developed an extensive nursery and seed business.

Susanna Bryant Dakin was born in Los Angeles on May 23, 1905. A few weeks before her death she asked me to read in typewritten form the memories of her girlhood, climaxing with her entering Marlborough School at the age of twelve. Perhaps she had in mind its publication, although it was primarily for the members of the family. This manuscript is frank, interesting, important, and done with Susanna's customary distinction. I had first thought, at starting the reading, that it would be the story of a "poor little rich girl." Actually it is the account of a rich little rich girl, even though there were moments of loneliness when she had to watch her playmates going off to public school, while she had always to be content with private tutors. Perhaps the highlight is the "Big Ride" of 1916, when, under Uncle Fred Bixby's leadership, she and her cousins rode horseback from Berkeley to Los Alamitos, a 522-mile trip.

Susanna went to Vassar College and received an A.B. degree in 1925. She also received significant direction in methods of historical research and writing from Margaret Bingham Stillwell, bibliographer, librarian, and writer. In 1930 she married a young engineer, Richard Y. Dakin, and in Pasadena raised a family—Roger, Susanna, Henry, Sara, and Mary. At the same period she was finding time for writing and for participation in various Southern California enterprises, such as Scripps College; a forerunner of the Pasadena Art Museum; and the Pasadena Chapter of the Red Cross Arts and Skills Corporation.

I have mentioned her *A Scotch Paisano—The Story of Hugo Reid*, which the University of California Press published in 1939. This was and is essentially a novelized biography, successfully handled and presented. As times goes on,

I believe it will continue to be thought of as one of California's most important literary products, as well as Susanna's best piece of sustained writing. Reid's Indian wife, Doña Victoria, was presented with such dignity that Susanna was pleased to be asked to serve as a consultant when the Indian Historical Society was organized. Had the author wished and had the author not become involved in so many public activities, she might well have become a novelist of distinction.

When the historic homesite of Rancho Santa Anita was bought by the State of California in 1947 and leased to Los Angeles County, plans were made to develop it as a state and county arboretum. Dr. Frits Went, the first president of the California Arboretum Foundation, appointed a Historical Committee. Since Rancho Santa Anita's first owner had been Hugo Reid and since the state-purchased site included the so-called Hugo Reid Adobe, as well as structures and plantings by later owners, notably E. J. (Lucky) Baldwin, it was natural to ask Susanna Dakin to become chairman. As worked out with Susanna's advice, the officers of the Historical Committee were Susanna Bryant Dakin and Georgina Hicks Mage as co-chairmen. Mrs. Mage was Susanna's long-time Pasadena friend. The co-secretaries were Lindley Bynum and W.W.Robinson. (Lindley allowed me to take the minutes.) Director of Restorations was Maurice Block, and Landscape Consultant was Edward Huntsman-Trout. Historical Curator was Dewey Nelson. Howard Miller was Treasurer.

Actually Susanna held loose reins on this committee which over the years had a continually changing group of members, persons concerned particularly with California history and architecture. Perhaps the most faithful attendants, other than the officers, were Ed Ainsworth of the *Los Angeles Times*, John Anson Ford, a sympathetic member of the Board of Supervisors, M. R. Harrington, Curator of the Southwest Museum, Architects Walter A.Walton and Burnett C. Turner, John C. Macfarland, an attorney, Jack Fawcett, an associate of Baldwin, Mrs. Forest Stanton, Mrs. Howard Cunningham, and Mrs. Alfred Murray. Dr.William S. Stewart, who became the Arboretum's director in 1955, and his wife, Maria, became frequent participants in meetings, as did other Arboretum staff members, and experts in various pertinent fields. The hard core of the male officers and members were called by Susanna—and most appropriately—her "old men's club."

The aim of the Committee was the architectural restoration of the existing

historic buildings—the so-called Queen Anne Cottage and the Baldwin Carriage House of the Baldwin regime, together with the reconstruction of the Hugo Reid Adobe, each restoration or reconstruction to be further enhanced by appropriate furnishings, decoration, and plantings.

Meetings were held outdoors in the fairyland setting developed by various owners of Rancho Santa Anita and beneath the shade of towering eucalyptus trees or alongside Baldwin Lake. On one occasion we met at Rancho Los Alamitos in one of the State's most charming homes dating from Spanish days. There our hosts were Fred H. Bixby, whom I like to call "the last of the rancheros," and his wife, Florence Green Bixby. Fred H. Bixby, Susanna's "Uncle Fred," served his over-size Old-Fashioneds. In the discussion that followed he remarked that he didn't see where all the money was coming from to restore the Queen Anne Cottage—a remark that caused inner smiles from some of his guests who had the intimation, though not the certain knowledge, that The Family Fund of the Dakins was taking care of that substantial item. Committee meetings, under Susanna's deft manipulation, were extremely informal and were closed with food and drink. To keep us all on the ball, there were even cocktail parties at the home of Georgina Mage and at the Valley Hunt Club.

The aims of the Historical Committee were attained—even though it was occasionally accused of trying to make a saint out of Lucky Baldwin whose interests ran rather strongly to women and horses. Today the whole complex of the Arboretum at Arcadia is a place of botanical and historical fascination and importance. There have been two million visitors, with the Queen Anne Cottage drawing greatest interest. The reconstruction of the Hugo Reid Adobe as a ranch foreman's structure of the 1840's, was financed by the State —as a result of appeals made by Dr. Stewart and Mrs. Dakin in a personal appearance before the State's division of Beaches and Parks meeting in San Francisco.

I asked Dr. Stewart what was Susanna's greatest contribution to the development of the whole Arboretum. He thought I meant money and said that between 1950 and 1967 the Dakins' Family Fund had contributed—without the Committee's knowledge—substantial sums for use in the Historical Area. I said no, I didn't mean money. Then he said: "Susanna's greatest contribution was her 'attitude.' "

In the middle of all this Arboretum activity Susanna and her family moved to the Bay Area—to the distress of Southern Californians. However, it turned out that Susanna maintained a flexible, traveling schedule, caught airplanes with ease, and picked up rental cars at the Los Angeles International Airport with which she could drive quickly to Pasadena and to the home of Georgina Mage. There were letters, too, between San Francisco and Arcadia—such as this one to Dr. Stewart:

Dear Bill, On the subject of *dust*, it was suggested that you—as director—write to Orville Johnson—a state authority for advice on ridding the Adobe and Coach Barn of this daily plague (he may answer that dust is authentic in early California dwellings, and even advise the introduction of fleas! . . .)

With her appointment by President Knowland to the Special Publications Committee of the California Historical Society, operating out of San Francisco, she took on new interests.

She named her new committee: Kenneth Bechtel, Lindley Bynum, Mrs. French Fogle, George Hammond, George Harding, Oscar Lewis, Aubrey Neasham, Mrs. Rogers Parratt, W.W. Robinson, Caroline Wenzel, and Carl Wheat. Later the "Special" committee became the "Publication Committee," and Francis Farquhar, Mrs. Clement Hurd, and Mrs. Van Rensselaer Wilbur joined the group. Meetings were held in a top-floor room in the Mansion of the CHS, a place that perhaps did not have the romantic overtones of Lucky Baldwin's menage. I recall, too, that we munched meagerly on sandwiches. On one occasion, though, joined by husbands and wives, we adjourned to Happy Valley in the Palace Hotel. Manuscripts were passed upon, books were published. I want to mention with particular pleasure the Christmas books that the Society published during Susanna's chairmanship. They represent her enthusiasm, her special efforts, and bear her unmistakable stamp, whether or not she wrote a foreword. These little books, all printed by Lawton Kennedy, were delightful excursions into the world of early California. The first was *Christmas in California*, Part One being "Christmas at Sutter's Fort in 1847" by John Bonner, Part Two "Christmas Before the Americans Came" by José Ramon Pico. It was followed by *Christmas at Rancho Los Alamitos*, written by Katharine Bixby Hotchkis (Susanna's cousin), illustrated by Clement Hurd. The third was *Navidad* and *Pastorela*, the first by Don Arturo Bandini, the second by Gwladys Louise Williams.

I call attention to another attractive Society publication that appeared after Susanna had given up her chairmanship but which received her enthusiastic backing. This was Joseph A. Baird's *Times Wondrous Changes*, devoted to San Francisco's architectural story. It was rushed out, in 1962, to be ready for the meeting in San Francisco of the National Trust for Historic Preservation. A change in publishing policy by the Society called for approval of expenditures by the Finance Committee. Susanna had therefore to be asked to agree to underwrite the book's costs. She did, and the book was not only a delight but a sell-out—proving that she could pick a winner and that the Finance Committee was overly cautious.

For her accomplishments in historical writing and for support of the Society's program Susanna Dakin was made a Fellow of the California Historical Society.

Susanna's forewords, prefaces, and introductions—appearing in various volumes—were of course labors of love—articulate and poetic tributes to friends or to specific achievements or to pleasant vistas in time. Such was her introduction to the published writings of Francis Farquhar, whose habit of praising others generously, but with discrimination, filled her with admiration. So, too, the tribute she paid in *The Perennial Adventure* to 95-year-old Alice Eastwood, retired Curator of Botany at the California Academy of Sciences. Miss Eastwood was not only a botanical authority on the Bay region but had had a long-time affiliation with the Rancho Santa Ana Botanical Garden founded by Susanna's mother. Both books appeared in 1954.

Probably the most pleasurable experience in research preceded that involved in Susanna's writing of an introduction to *YoSemite 1878 Adventures of N & C—Journal and Drawings by Carrie E. LeConte*. This appeared in the Malette Dean-printed volume which The Book Club of California so beautifully brought out in 1964. Here are presented the entertaining adventures of two high-spirited girls who took a camping trip to Yosemite in 1878. The journal and drawings reproduced were a part of the Le Conte Family Papers in the Bancroft Library.

Because of Susanna Dakin's gratitude for the memory of Dixon Wecter, she made it possible for an extraordinary collection of Mark Twain material to be added to the Twain collection in the University of California. Dixon Wecter had been Mark Twain's literary executor. The new papers included 500 letters and the files of the *Territorial Enterprise*.

While Susanna could say *no*—tactfully—she loved to help individuals who seemed likely to help themselves. She gave constructive assistance, sometimes at the crucial time. She found herself especially interested in people in "the arts" or with artistic potentialities. She did not worry if she supported a lost cause. To one young man whom she helped when he needed it the most she said: "I have contributed to many cultural causes but you happen to be a cultural cause that has gone on." Painters, sculptors, writers, bookdealers, ceramists have reason to bless her name. For example, there was Susie Singer, a gifted artist-refugee from Austria whom Susanna took under her wing in the 1930's. She got her a small house in Pasadena, adequate for her needs and that of her child, bought her a kiln, even sent her own children to her for art instruction. As usual, the help given this ceramist was a quiet, almost secret, act.

Susanna and members of her family found time for traveling, particularly in Europe. Let me quote from a letter written early this year by Jake Zeitlin to Susanna's daughter, Sue Arp (Mrs. Halton Christian Arp), and having to do with a meeting of Josephine and Jake Zeitlin with the Dakins in England:

One of my most treasured memories shall always be of the days we spent together several years ago in England. We rode to Brighton in the second class coach together with two charwomen who explained the mysteries of English money to your mother and gave her an English tuppence. We wandered through the bewildering splendor of the Pavillion and the museum, strolled on the pier and rode back first class with tea and a nap to shorten the ride. The next day we took the excursion boat at Westminster Bridge and traveled to Greenwich. Dick was especially taken with the navigation instruments and collected printed matter and made notes to write about them to your husband. One afternoon I took your mother to visit the Director of the British Museum so that she might look at the library of Prince Henry, a favorite of her college studies. And finally we had a dinner at Green's Hotel with London friends, full of good jokes, good talk and laughter. Your mother lost her usual shyness and as we stood in the street she kissed us all good night.

Susanna, brought up to be a participant in "Society"—spelled with a capital *S*—liked the pleasurable aspects of living, agreeable people, lighthearted fun, good food and good wine. She was knowledgeable in the matter of wine and admired that knowledgeability in her friends. She and her family loved to watch connoisseur Lindley Bynum's ritual of approaching, savoring, and defining a glass of vintage wine.

Not only individuals but institutions were the beneficiaries of the Dakin family's interests. Susanna and Richard Dakin actively supported the Franklin Hospital, with Richard serving as president of the board of trustees since 1955 during the period in which the new hospital building was planned. Both worked with the American Friends Service Committee, in sympathy with its program, and as friends of various libraries in Southern and Northern California.

That brings us to the Friends of the Bancroft Library, with Susanna showing the same excited interest she had shown in Arboretum activities. Dr. George P. Hammond, the long-time director of the Bancroft Library, would probably have said—as did Dr. Stewart—he appreciated above all else Susanna's "attitude." She had been and was a constant user of the Library. As a member of the Friends, she served on the Council, and became Secretary of the organization. At the time of her death she was also editor of *Bancroftiana*. Published by the Friends in 1963 was her *Rose, or Rose Thorn?—Three Women of Spanish California*. Deftly handled, and based on extensive research, the quality of writing shown is again that of the novelist—reminding one of that shown in *Scotch Paisano*.

Another vital type of support for the Bancroft Library was that given by Susanna and her family to important acquisitions. In 1959 Warren R. Howell and Jake Zeitlin had an opportunity to go through the library of Martin Carrencedo in Mexico City and to purchase and bring back to the United States the entire collection. When George Hammond saw the important documents on California and the Spanish Southwest—including letters of Junípero Serra and of Father Kino—his imagination caught fire. The Friends were urged to obtain the rich assemblage of manuscripts. Susanna was one who appreciated the significance of the material. As a result of her and others' help, the collection became a part of the Library.

I want to emphasize another important assemblage that became the Bancroft's. That is the Robert B. Honeyman Collection of early Californian and Western pictorial material. Warren Howell had worked closely with Mr. Honeyman over the years in bringing it together. George Hammond got the Friends to raise the impressive sum involved in its purchase. The collection is described by Susanna Dakin as "comprising oils, watercolors, drawings, lithographs, engravings, etchings, woodcuts, early photographs, one of the finest

selections of 'letter sheets' . . . and a miscellany which includes manuscripts, maps, scrapbooks, nostalgic sheet music, children's games, colorful advertising cards and illustrated stock certificates." This description by Susanna Dakin appears in *GHP—An Informal Record of George P. Hammond And His Era in the Bancroft Library*, a volume beautifully printed by Lawton and Alfred Kennedy and issued in 1965 as a tribute to G.P.H. on his retirement as Director. The book was written by a group of his friends and associates. Susanna Dakin encouraged others to participate in the fund-raising, offering to help if they would help. She and her family "seeded the fund," as it were, spurred others on to assist, and the Bancroft Library obtained the Honeyman Collection.

As Dale Morgan phrased it, Susanna Dakin "had a deep affection for friends and rare insight into their qualities." Consider her comment on the death of Freda Kennedy, the wife of Lawton Kennedy. She almost succeeded in defeating death when she wrote in 1965 that "the valley of life is shadowed with death" and "death rims life with the beauty of transiency." The sad death of her own young daughter Sara in 1961 had made it necessary for Susanna to live with, understand and accept death. The death of her friend Lindley Bynum in 1965 inspired her to work with Josephine Bynum and the Bynum family in assembling and bringing out a group of Lindley's poems: *High Treasure*, *Songs of the Sierra.*

One last statement. Just before the Dakins left on their final flight, Susanna wrote this note on a Christmas card to Gertrude M. Woods of the Arboretum staff:

Our family is off to spend the holidays (December 20–29) by the Sea of Cortez—in Bahia de las Palmas . . . I'm all for the publication of the SBD pamphlet and will take a copy of the Summer '56 *Lasca Leaves* to look over and see what changes should be made." (She was referring to her *Place of Many Waters*, the history of the Arboretum area which was planned for republication.)

That note was received at the Arboretum on December 20, 1966—the day that the plane, which carried Susanna, Richard, and six other members of the Dakin family, fatally crashed into the sea.

Good works, good books—they live!